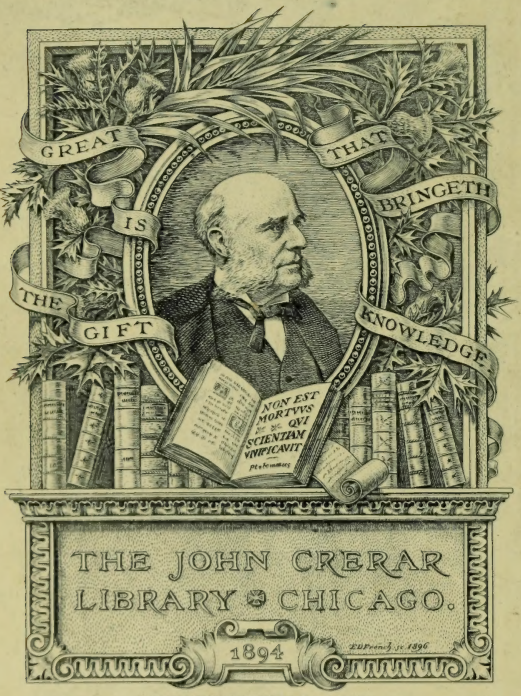

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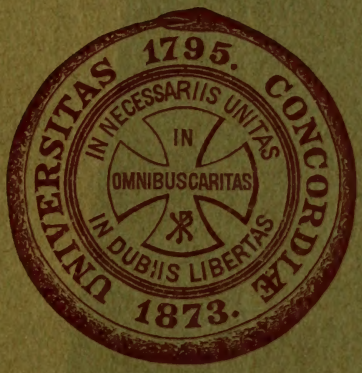

1902-1903

ONE HUNDRED AND EIGHTH YEAR

NEW YORK
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ANNUAL CATALOGUE

OF

UNION UNIVERSITY

1902-1903

NEW YORK
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UNION UNIVERSITY

COLLEGE CALENDAR FOR 1903

	S	M	T	W	T	F	S
Jan.	..	..	..	..	1	2	3
	4	**5**	**6**	**7**	**8**	**9**	10
	11	**12**	**13**	**14**	**15**	**16**	17
	18	**19**	**20**	**21**	**22**	**23**	24
	25	**26**	**27**	**28**	**29**	**30**	31
Feb.	1	**2**	**3**	**4**	**5**	**6**	7
	8	**9**	**10**	**11**	**12**	**13**	14
	15	**16**	**17**	**18**	**19**	**20**	21
	22	**23**	**24**	**25**	**26**	**27**	28
Mar.	1	**2**	**3**	**4**	**5**	**6**	7
	8	**9**	**10**	**11**	**12**	**13**	14
	15	**16**	**17**	**18**	**19**	**20**	21
	22	**23**	**24**	**25**	**26**	**27**	28
	29	**30**	**31**	..	..	..	..
Apl.	..	..	..	**1**	**2**	**3**	4
	5	**6**	**7**	**8**	**9**	10	11
	12	13	**14**	**15**	**16**	**17**	18
	19	**20**	**21**	**22**	**23**	**24**	25
	26	**27**	**28**	**29**	**30**	..	..
May	..	..	..	..	..	**1**	**2**
	3	**4**	**5**	**6**	**7**	**8**	9
	10	**11**	**12**	**13**	**14**	**15**	16
	17	**18**	**19**	**20**	**21**	**22**	23
	24	**25**	**26**	**27**	**28**	**29**	30
	31	..	..	..	..	..	..
June	..	**1**	**2**	**3**	**4**	**5**	6
	7	**8**	**9**	**10**	11	12	13
	14	15	16	17	18	19	20
	21	22	23	24	25	26	27
	28	29	30	..	..	..	..

	S	M	T	W	T	F	S
July	..	..	..	1	2	3	4
	5	6	7	8	9	10	11
	12	13	14	15	16	17	18
	19	20	21	22	23	24	25
	26	27	28	29	30	31	..
Aug.							1
	2	3	4	5	6	7	8
	9	10	11	12	13	14	15
	16	17	18	19	20	21	22
	23	24	25	26	27	28	29
	30	31	..	..	..	..	..
Sept.	..	..	1	2	3	4	5
	6	7	8	9	10	11	12
	13	**14**	**15**	**16**	**17**	**18**	**19**
	20	**21**	**22**	**23**	**24**	**25**	26
	27	**28**	**29**	**30**	..	..	..
Oct.	..	..	..	..	**1**	**2**	3
	4	**5**	**6**	**7**	**8**	**9**	10
	11	**12**	**13**	**14**	**15**	**16**	17
	18	**19**	**20**	**21**	**22**	**23**	24
	25	**26**	**27**	**28**	**29**	**30**	31
Nov.	1	**2**	3	**4**	**5**	**6**	7
	8	**9**	**10**	**11**	**12**	**13**	14
	15	**16**	**17**	**18**	**19**	**20**	21
	22	**23**	**24**	**25**	26	27	28
	29	**30**	..	..	..	..	..
Dec.	..	..	**1**	**2**	**3**	**4**	**5**
	6	**7**	**8**	**9**	**10**	**11**	12
	13	**14**	**15**	**16**	**17**	18	19
	20	**21**	**22**	**23**	24	25	26
	27	28	29	30	31	..	..

Figures in heavy type indicate days on which Union College is in session.

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1902/03-1904/05

UNIVERSITY CALENDAR

1903.

5 Jan.	Winter term of Union College begins.
5 Jan.	Winter term of Medical College resumes.
22 Jan.	Day of Prayer for Colleges.
31 Jan.	First semester of Law School ends.
4 Feb.	Second semester of Law School begins.
20 Feb.	Allison-Foote Prize Debate between the Literary Societies.
23 Feb.	Celebration of Washington's Birthday.
7 March	Examination for conditioned students.
26 March	Winter term of Union College ends.
30 March	Commencement of the College of Pharmacy.
30 March	Spring term of Union College begins.
15 April	Selection of Junior and Sophomore prize orators.
2 May	Examination for conditioned students.
5 May	Commencement of the Medical College.
15 May	Date for presentation of prize essays.
29 May	Senior Examinations end.
29 May	Commencement of Law School.
30 May	Memorial Day.
7 June	Sunday. Baccalaureate Sermon, Union College.
8 June	Prize Contest in Extemporaneous Speaking, and Prize Oratory of Juniors and Sophomores.
9 June	Meeting of Trustees, Phi Beta Kappa, Sigma Xi, Alumni.
10 June	Commencement of Union College, the second Wednesday in June. President's reception.
11, 12 June	Entrance examinations, Union College.
14 Sept.	Registration Day for Freshmen, Union College.
16 Sept.	Registration Day for Students other than Freshmen, Union College. Entrance Examinations, Union College.

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University Calendar—Continued

1903.

17 Sept.	First Chapel Exercises and Recitations, Entrance Examinations concluded.
18 Sept.	Freshman Recitations begin.
19 Sept.	Examination for conditioned students.
22 Sept.	Registration day, Law School.
22 Sept.	Winter term of Medical College begins.
23 Sept.	Law School begins.
5 Oct.	The College of Pharmacy begins.
3 Nov.	Election Day.
26 Nov.	Thanksgiving Day. Recess four days.
5 Dec.	Examination for conditioned students.
23 Dec.	Fall term of Union College ends.

1904.

4 Jan.	Winter term of Union College begins.
4 Jan.	Winter term of Medical College resumes.
22 Jan.	Day of Prayer for Colleges.
20 Feb.	Allison-Foote Prize Debate between the Literary Societies.
22 Feb.	Washington's Birthday.
5 March	Examination for conditioned students.
25 March	Winter term of Union College ends.
28 March	Spring term of Union College begins.
31 March	Commencement of the College of Pharmacy.
5 June	Sunday. Baccalaureate Sermon, Union College.
6 June	Prize Contest in Extemporaneous Speaking, and Prize Oratory of Juniors and Sophomores.
7 June	Meeting of Trustees, Phi Beta Kappa, Sigma Xi, Alumni.
8 June	Commencement of Union College, the second Wednesday in June. President's reception.
9, 10 June	Entrance Examinations, Union College.

UNION UNIVERSITY

Union University embraces the following institutions:

UNION COLLEGE.

ALBANY MEDICAL COLLEGE.

ALBANY LAW SCHOOL.

DUDLEY OBSERVATORY.

ALBANY COLLEGE OF PHARMACY.

Union College acquired by its charter, granted in 1795, full University powers, but the creation of graduate institutions at Schenectady was not found practicable. Schools of Law and Medicine and also an Astronomical Observatory have long existed at Albany, only a few miles distant. The arrangement naturally suggested by these circumstances was, that the Professional Schools and the Observatory at Albany should be united with Union College, under the Charter and Board of Trustees of the latter. This was accordingly effected by the incorporation of Union University in 1873. The Albany College of Pharmacy was created by the Board of Governors, June 21, 1881, and incorporated as a Department of the University, August 21, of the same year.

The President of Union College and permanent Chancellor of Union University has the oversight of the University, each of the institutions having its resident Dean. The Dean of Union College acts in the place of the President in his absence, and also assists him in matters delegated to him by the President. The University Board of Governors is composed of permanent trustees of Union College, and of representatives of each of the other institutions embraced in Union University.

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Honorary Chancellor, 1902

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UNION COLLEGE

ACADEMIC DEPARTMENT OF

UNION UNIVERSITY

SCHENECTADY, N. Y.

UNION COLLEGE

Union College was incorporated by the Regents of the University of the State of New York on the 25th day of February, 1795. It was the second college incorporated in the State, and the first north of the city of New York and west of the Hudson River. It received its name from the circumstance that several religious denominations co-operated in its organization, and was the first college in the United States which was not of a strictly denominational character. It has continued from its foundation to be the representative institution of Christian unity.

The first president of Union College was the Rev. John Blair Smith, of Philadelphia. He was elected in 1795, and resigned in 1799, only a few months before his death. He was succeeded by Jonathan Edwards, the younger, who died in 1801. The Rev. Jonathan Maxcy, previously president of Brown University, succeeded Dr. Edwards, and resigned at the end of two years. In 1804 the Rev. Eliphalet Nott was elected president of Union College, which office he held until his death, on the 29th day of January, 1866. The Rev. Laurens P. Hickok, a graduate of the College, who had long acted as vice-president, was elected his successor. He resigned in 1868. The Rev. Charles A. Aiken succeeded Dr. Hickok in 1869, and resigned in 1871. The Rev. Eliphalet Nott Potter was elected president in 1871, and inaugurated June 20, 1872. On his resignation, in 1884, the Hon. Judson S. Landon, LL. D., was appointed president *ad interim,* and served until the inauguration of Harrison E. Webster, LL. D., who was elected president May 23, 1888, and inaugurated June 26, 1888. On his resignation, in January, 1894, Rev. Andrew V. V. Raymond, D. D., LL. D., was elected president and inaugurated in June, 1894.

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EDWARD P. WHITE, A. M., Amsterdam, term of office expiring June, 1904.

FREDERICK W. CAMERON, A. M., Albany, term of office expiring June, 1905.

Rev. PHILIP H. COLE, D. D., Syracuse, term of office expiring June, 1906.

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CLARENCE J. COLEY, M. E.,
Instructor in Electrical Engineering.

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HERBERT L. TOWNE, M. D.,
Director of Gymnasium.

CHARLES B. POND,
Assistant Treasurer.

GEORGE CLUTE,
Superintendent of Grounds and Buildings.

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LIBRARY.—Professors Hale, Wright and Wilkens.

CATALOGUE.—Professors Ripton and Hale and Mr. March.

SCHOLARSHIPS.—Professors Ripton and Williams and Mr. March.

STAGE APPOINTMENTS.—Professors Wright, Stoller and Edwards.

ATHLETICS.—Professor Williams, Mr. March and Dr. Towne.

RULES.—Professors Ashmore, Wright and Hoffman.

SENIOR CLASS.—Professors Truax and Landreth and Mr. March.

JUNIOR CLASS.—Professors Stoller, Ashmore and Curtiss.

SOPHOMORE CLASS.—Professors Hoffman, Bennett and Wilkens.

FRESHMAN CLASS.—Professors Hale and Opdyke and Mr. Williams.

ADMISSIONS.—Professors Ripton, Truax, Ashmore, Wright, Landreth, Bennett, Wilkens and Dr. Towne.

DISCIPLINE.—Professors Ripton, Landreth, Hale and Bennett and Mr. March.

MUSIC.—Professors Bennett and Wilkens and Mr. March.

PREPARATORY SCHOOLS.—Professors Bennett, Williams and Edwards and Messrs. March, Wheeler and Williams.

STUDENTS

Abbreviations

c, A. B. course; *ls,* Ph. B. course; *s,* B. S. course; *g e,* B. E. course in General Engineering; *s e,* B. E. course in Sanitary Engineering; *e e,* B. E. course in Electrical Engineering; N. C., North College; S. C., South College.

Seniors, Class of 1903

ge ARCHIBALD LAMON ANDERSON...*Ballston Spa*... S. S. S. C.
gr s FREDERICK JANSON BALZ..... *Amsterdam*.... 63 N. C.
s ARTHUR ERNEST BISHOP..... *Oneonta*.....ΦΔΘ House
c JOHN ALBERT BOLLES..... *Kortright*.....Δ Υ Lodge
s JOSEPH R. BROWN, JR.....*Seward*.....ΦΓΔ House
ls MOREY CHARLES COLLIER.....*Savona*.... Medical College
c FRANK H. DALEY.....*Coxsackie*.....Δ Υ Lodge
c THOMAS G. DELBRIDGE..... *Batavia*..... Κ Α Lodge
ee WILLIAM J. DICKENSON.....*Flycreek*..... 58 N. C.
c GEORGE WILLIAM DONNAN..... *Troy*..... Κ Α Lodge
c RAYMOND CURTIS DONNAN..... *Troy*..... Κ Α Lodge
ls JOSEPH GEORGE FENSTER.....*Troy*..... S. S. S. C.
ee LAWRENCE J. GALLAGHER.....*Troy*..... Troy
s GUY BROWN GRISWOLD..... *Whitehall*.....ΦΓΔ House
ls JAMES Q. GULNAC.....*Binghamton*...ΑΔΦ House
s CLINTON BENJAMIN HAWN..... *Albany*.....Medical College
c SAMUEL B. HOWE, JR.....*Schenectady*...ΑΔΦ House

ls Herbert G. Hoxie.....*Cambridge*.....Χ Ψ Lodge
gr s Louis Tiffany Hunt.....*Ephratah*.....Δ Υ Lodge
s Albert Henry Kessler.....*Schenectady*.....Δ Φ House
g e James Franklin Morgan.....*Fort Edward*... 58 N. C.
g e Francis James Mulvaney.....*Worcester*.....Δ Φ House
e e Glowacki Parker.....*Batavia*..... S. S. S. C.
c Henry Arthur Pearce.....*Plainfield, N. J.* Silliman Hall
ls Allen Steele Peck.....*Batavia*..... S. S. S. C.
e e Arthur Guy Pickens.....*Cooperstown*..Φ Δ Θ House
ls Frederic H. Powell.....*Worcester*..... Δ Φ House
s Edward Holland Rider.....*Unadilla*.....Δ Υ Lodge
c Bert William Roy.....*Clyde*.....Δ Υ Lodge
ls Louis F. Schroeder.....*Port Leyden*...Φ Γ Δ House
s John Leopold Staeber.....*Lancaster*.....Δ Φ House
ls Thomas Richard Tillott, Jr...*Schenectady*.. 228 Union St.
c Gordon Emmons Van Loon....*Coxsackie*..... Δ Υ Lodge
ge Harry P. Willis.....*Schenectady*. 9 Catharine St.

Seniors, 34.

Juniors, Class of 1904

e Harry R. Andress.....*Gansevoort*.....Δ Φ House
c Walter Edward Beadle.....*Cooperstown*..Φ Δ Θ House
s Arthur Lee Benning.....*Clyde*.....Δ Υ Lodge
c John Francis Bradley.....*Troy*..... Troy
c Claude Norton Brown.....*Barnerville*.... 54 N. C.

e William Gideon Closson.....*Gloversville*.....Δ Υ Lodge
c Thaddeus Guilford Cowell....*Albany*..... 90 N. C.
e Walter George Craig.....*Plattsburgh*.....Ψ Υ House
c J. Lewi Donhauser.....*Albany*.....Φ Δ Θ House
ls Stephen Calkin Fiero.....*Katsbaan*.....Κ Α Lodge
ls William Henry Guardenier...*East Springfield*,Φ Δ Θ House
c Cornelius Lansing Hays.....*Albany*.....Φ Δ Θ House
e Leland Wesley Irish.....*Caldwell*.....Δ Φ House
c James Fuller Lawsing.....*Schenectady*...Κ Α Lodge
ls Andrew Wright Lent.....*Highland*.....Φ Δ Θ House
ls Luke Francis Lovelock.....*Troy*..... 89 N. C.
ls John Aloysius Mahar.....*Rensselaer*..... Rensselaer
c Carl Esselstyn McCombs.....*Frankfort*.....Χ Ψ Lodge
e James Edward Molony.....*Schenectady*... 816 State St.
s Elbert Verity Mullenneaux...*Albany*..... Ψ Υ House
s Henry Seymour Olmsted..*Chattanooga, Tenn.*,.Φ Γ Δ House
c John Fay Putnam.....*Johnstown*.....Δ Υ Lodge
s Elbert Theodore Rulison, Jr...*Schenectady*.. 1208 State St.
s Archibald Hamilton Rutledge.*Santee, S. C*.... Κ Α Lodge
e George Vaughn Sherrill.....*Sandy Hill*.....Ψ Υ House
ls George Earl Smith.....*Schenectady*.349 Romeyn St.
ls Charles Gowdy Stiles.....*Lansingburgh*...Ψ Υ House
e Winslow Barnes Watson.....*Plattsburgh*.... S. S. S. C.
e Harry Rogers Wickham.....*South Bethlehem* 54 N. C.

Juniors, 29.

Sophomores, Class of 1905

c Frank Rudd Andrews.....*Yonkers*.....Χ Ψ Lodge
e Clarence Stilman Arms.....*Sidney*.....Δ Υ Lodge
e Elvin Jay Becker.....*Middleburgh*... South Colonnade
e Henry Gordon Burnham.....*Glens Falls*....Κ Α Lodge
c Robert Wilson Clark.....*Amesbury, Mass*..Α Δ Φ House
e James Hannah Cunningham..*Schenectady*..1101 State St.
e Edgar Whritenour Earle.....*Lancaster*..... 57 N. C.
ls Ernest Judson Ellenwood.....*Dannemora*.....Δ Υ Lodge
ls George Myres Elmendorf.....*Alcove*.....Β Θ Π House
e Frank Thorburn Forster.....*Nyack*.... 515 Summit Ave.
e James Michael Gagen.....*Amsterdam*.... 57 N. C.
e Arthur Merrill Hagar.....*Plattsburgh*..Β Θ Π House
ls Louis Chrisler Hart.....*Albany*..... Κ Α Lodge
e Neil Cummings Holdredge. .*West Burlington*.Β Θ Π House
s Thomas Milton Holmes.....*Albany*.....Δ Υ Lodge
e William Theodore Hunt.....*Otego*..... 70 N. C.
e William James Jones.....*Hagaman*.....514 Union St.
e Eric Ture King.....*Rosebank*.....Α Δ Φ House
e Morland King.....*Brooklyn*..... 81 N. C.
e Herman Carl Kluge.....*Elmira*..... 96 N. C.
ls Frank Ira Losee.....*Fergusonville*.. 63 N. C.
s Charles Malcolm McGregor...*Gloversville*.... 70 N. C.
c Thomas Earl McGuirk.....*Albany*.....Δ Φ House
e William Orson Morse.....*Camden*.....10 Park Ave.
e John Rowland Nowell.....*Anderson, S. C.* The Rookery
e Walter Ernest Nutt.....*Hoosick*..... 92 N. C.

e Le Roy Lee Odell..... *Poughkeepsie*.. Β Θ Π House
c Frederic Curtis Patton.....*Rensselaer*....Α Δ Φ House
e John Henry Ray.....*Rheims*..... 10 Park Ave.
c Morris Thomas Raymond.....*Schenectady*... College Hill
e Herbert Eugene Reeves.....*Glens Falls*.. 629 Liberty St.
e Edmund Gaillard Simons.....*Eutawville, S. C.* 71 N. C.
c Rolland Barker Smith.....*Peru*..... Δ Υ Lodge
ls James Rose Stevens, Jr.....*Cohoes*.....Φ Γ Δ House
ls Alexander J. Thompson, Jr..*Schenectady*..20 No. Church St.
e Karl Frederick West.....*Caldwell*.....Κ Α Lodge
e Frank Sperring Wheeler.....*Sidney*..... Δ Υ Lodge
e Guy Foster Whipple..... *Malone*..... 92 N. C.

Sophomores, 38.

Freshmen, Class of 1906

e LeVan Ransom Barnes.....*Clyde*.....Ψ Υ House
e LeRoy Beers.....*Schenectady*... 28 Eagle St.
c Charles Frederick Bissell.....*Elmira*.....Β Θ Π House
s Frederick Blake.....*Brooklyn*.....Α Δ Φ House
s Charles Barton Brodrick.....*Elkhart, Ind*....Ψ Υ House
s William Le Roy Brooks.....*Albany*.....Α Δ Φ House
ls Joseph Hawley Brown..... *Unadilla*..... 17 Jay St.
ls Francis Barry Cantwell..... *Malone*.. 808 University Pl.
e Melvin David Casler.....*Johnstown*..... 73 N. C.
e Grant Wilcox Chadwick.....*Luzerne*.....Φ Γ Δ House
e Arnold G. Chapman.....*Guilderland*.....Ψ Υ House

c William Bradt Christopher... *Schenectady*.. 10 Seward Pl.
e Charles Robert Clark.....*Plattsburgh*.....Δ Υ Lodge
c Philip Luke Classen.....*Albany*..... Ψ Υ House
e Edward Warren Cleeves.....*Salisbury Mills*. 75 N. C.
e Edgar Stone Closson..... *Gloversville*.....Δ Υ Lodge
c Harry Cook..... *Albany*..... Φ Γ Δ House
ls George Rodger Cozzens.... *Saratoga Springs*.....Ψ Υ House
e Ernest Montgomery Dann.....*Downsville*....Φ Δ Θ House
ls Ernest Willis Davis...*Schenectady*..Glenwood Boulevard
e Victor Henry Durler.....*Schenectady*..832 Union St.
e Charles Stevens Dwight, Jr.. *Columbia, S. C*. 69 N. C.
e Harry Daniel Fuller..... *Rochester*.....Δ Υ Lodge
e John Gibbons.....*Dormansville*.. South Colonnade
s James Elmer Gilmour.....*Ogdensburg*....Δ Υ Lodge
c Paul Jonathan Hagar.....*Plattsburgh*.... 61 N. C.
e Harry Nelson Haight.....*Fishkill*.....Φ Δ Θ House
e George Francis Hall...*Albany*...19 Bradford St., Albany
e George Reginald Hamilton..*Princess Anne, Md*.Χ Ψ Lodge
ls Rosslyn Philip Harris..... *Delanson*.....Β Θ Π House
c Leander Franklin Heacock. *North Tonawanda* Δ Φ House
ls George Walter Hitt.....*Unadilla*.....560 Liberty St.
e Leslie Gilbert Holleran..... *Hadley*..... 31 Front St.
e Claude Kinne Huston.....*Selma, Ala*.. 17 Mynderse St.
ls Daniel Ferguson Imrie.....*Caldwell*.....Δ Φ House
e Warner King.....*Brooklyn*.....Α Δ Φ House
c Hugh Lodge Lamont.....*Valatie*..... S. S. S. C.
e William Comstock Landreth..*Schenectady*... College Hill
c John Joel Lawrence.....*Schenectady*...36 University Pl.

s LEON RAY LEWIS.....*Gilboa*....North Colonnade
c VICTOR OLAF LUNDGREN.....*Schenectady*... 429 Liberty St.
e DANIEL PROVOOST MANNING.....*Albany*.....X Ψ Lodge
s HERRICK MCCLENTHEN.....*Jefferson*..... 68 N. C.
ls PAUL ALONZO MEAD.....*Schenectady*. 4 Duryea Ave.
ls FLOYD LESLIE MILLER.....*Fort Plain*.....Δ Φ House
s THOMAS JOSEPH MOONEY.....*Schenectady*. 510½ State St.
e JOHN ALOYSIUS O'DONNELL....*Salem*...722 East Liberty St.
e JOHN BRADBURY PEEBLES.....*Petersburg, Va.* The Rookery
e LEIGHTON HARTWELL PEEBLES..*Petersburg, Va.* The Rookery
s RALPH CHANDLER PARKER.....*Batavia*..... S. S. S. C.
e SAMUEL JOHNSTON RAYMOND....*Buffalo*.....A Δ Φ House
c BYRON WILLIAM REED.....*Olean*.....Δ Y Lodge
e EL ROY SHIBLEY REEDER.....*Binghamton*... Ψ Y House
e LERAY THOMPSON REEDER.....*Binghamton*... Ψ Y House
s LORENZO N. RIDER.....*Bath*.....X Ψ Lodge
ls CHARLES ROBERT SAWYER.....*Glens Falls*..... S. S. S. C.
ls DWIGHT MILTON SAWYER.....*Glens Falls*..... S. S. S. C.
s GILBERT VAN EVERA SCHENCK...*Rensselaer*....A Δ Φ House
s GEORGE GIRARD SCHIEFFELIN.....*Stokesdale, Pa.* Ψ Y House
e RAYMOND DERRICK SHERMAN....*Melrose*..... 96 N. C.
e STANTON COLE SHERMAN.....*Salem*.....K A Lodge
c GEORGE LEWIS SUTHERLAND.....*Fort Plain*.....X Ψ Lodge
e WILLIAM EDMUND STONEY.....*Pinopolis, S. C.* 69 N. C.
e HARRY ADELBERT SYLVESTER...*Schenectady*.. 817 Locust Ave.
c DEWITT CLINTON VAN ZANDT, JR. *Schenectady*.. R. F. D. No. 1
e CARL OTTO VON DANNENBERG....*Stapleton*.....A Δ Φ House
s CHARLES NEWMAN WALDRON... *Detroit, Mich*..A Δ Φ House

e John Gibbon Webb.....*Summerville, S. C.* 69 N. C.
e Nelson Philip Weier.....*Lyons*..... 60 N. C.
c Walter Fanstone Wellman...*Schenectady*... 922 State St.
c Joseph Thatcher Wright.....*Pulaski*.....A Δ Φ House
e Robert S. Wright.....*Pulaski*..... S. S. S. C.
ls Meade La Fayette Zimmer.....*Gallupville*....B Θ Π House

Freshmen, 73.

Irregular Students

('03 *c*) Robert Finney Barrett....*Plattsburgh*...Φ Δ Θ House
('04 *s*) Joseph Gilbert Cool.....*Glens Falls*... Silliman Hall
('04 *e*) William Clark Durant..*Saratoga Springs*. X Ψ Lodge
('03 *ls*) Norman Norton Gould.....*Penn Yan*..... Δ Υ Lodge
('04 *ls*) Edward Douglas Greenman *Albany*..... X Ψ Lodge
('04 *s*) Charles Edwin Heath.....*Schenectady*....607 State St.
('05 *e*) Alfred John Kaufman.....*Rensselaer*..... Rensselaer
('03 *ge*) Otis F. Lewis.....*Gilboa*....North Colonnade
('04 *c*) Samuel Dimock Palmer...*Ogdensburg*...A Δ Φ House
('05 *s*) Charles Emmet Quinn....*Cohoes*..... S. S. S. C.
('05 *e*) Rowland Stebbins.....*New York City*..Ψ Υ House
('04 *ls*) William Carl Treder.....*Albany*..... B Θ Π House
('05 *s*) George Arthur Vedder.....*Schenectady*... 16 Eagle St.
('05 *e*) James Warren.....*Heuvelton*.....Δ Φ House

Irregular Students, 14.

Graduate Course in Electrical Engineering

H. H. ADAMS, B. S., 1901, Leland Stanford.....408 Union St.
R. E. ARGERSINGER, B. E., 1901, Union.....631 Chapel St.
E. W. ALLEN, B. S., 1900, Virginia Polytechnic.....14 Union St.
VICTOR BRUNSKOG, E.E., 1900, Roy. Inst. Stockholm.9 Lafayette St.
CARL A. BESSEY, B. S., 1899, Nebraska.....1219 State St.
J. L. BURNHAM, B. E., 1899, Colorado.....29 Chestnut St.
V. CHRONANDER, E. E., 1899, Roy. Inst. Stockholm,
410 Schenectady St.
KENNETH L. CURTIS, B. E., 1901, Colorado.....19 Mynderse St.
A. P. DAVIS, S. B., 1901, Worcester Polytechnic.....749 State St.
JOHN H. DEMPSTER.....29 Campbell Av.
O. HOLZ.....117 Liberty St.
JOHN HARDEN, E. E., 1896, Stockholm; 1902, Zurich,
333 Wendell Av.
H. H. HESS, E. E., 1898, Lehigh.....Box 125, Scotia, N. Y.
WM. C. JANNEY, B. E., 1901, Pennsylvania.....14 No. Ferry St.
KINICHI IWAI.....167 Lafayette St.
R. J. KITTREDGE, M.E.,1896,Cornell,Prof.Phy.U.C.I..1110 Union St.
A SOMERS KAPELLA, E E., 1895, Lehigh.....1010 State St.
MARTIN J. LIDE, B. S., 1902, Alabama Polytechnic..624 Chapel St.
N. C. MILLS, B. S., 1902, Tufts.....16 Willow St.
LAWRENCE MANNING.....211 Brandywine Av.
H. MAXWELL, B. S., 1900, Kansas.....832 Union St.
J. E. NOEGGERATH, E. E. 1901, Hannover.....409 Union St.
H. B. OATLEY, B. E., 1900, Vermont.....311 Clinton St.
H. RIDGELEY, B. E., 1901, Purdue.....1106 State St.
GEORGE W. SANDERS, M. E., 1901, Stevens.....1113 State St.
KARL STROMBERG, M. E., 1900, Helsingfors.....333 Summit Av.
F. L. STONE, S. B., Worcester Polytechnic.....19 Wendell Av.
A. R. TANNER, B. E., 1901, Purdue.....1106 State St.
W. R. WHITNEY,Ph.D.,Prof.Electro-Chemistry at M.I.T.5 State.St.
E. P. WALLER, B. S., 1900, Virginia Polytechnic.....14 Union St.
O. F. WHITEHURST, B. S., 1900, Virginia Polytechnic,
25 No. Ferry St.
S. YAMAZAKI, M. E., 1902, Cornell.....791 State St.

Graduate Students, 32.

Summary of Students

Seniors	34
Juniors	29
Sophomores	38
Freshmen	73
Irregular Students	14
Graduate Students	32
Total	220

COURSES OF STUDY

1.—Course leading to the degree of A. B.

This is the usual classical course. Latin and Greek are required for two years, and are elective for the remainder of the course. French and German are included in addition to the ancient languages.

2.—Course leading to the degree of Ph. B.

This course offers Latin without Greek, for which is substituted additional work in modern languages and science.

3.—Course leading to the degree of B. S.

This course is based upon the study of mathematics and the sciences, with extended work in English and other modern languages.

In courses 1, 2 and 3 the greater part of the work of the last two years is elective.

4.—General course leading to the degree of B. E.

This course is intended to give the basis of an Engineering education, including the fundamental principles of all special branches of the profession, a knowledge of both French and German and a course in English.

5.—Sanitary course leading to the degree of B. E.

This differs from course 4 in substituting special work in Sanitary Engineering for some of the General Engineering studies.

6.—Electrical course leading to the degree of B. E.

This course is intended to give a broad and thorough Engineering education, with the specific instruction requisite for Electrical Engineering.

Students having the profession of Medicine in view are permitted to take the first year studies of the Albany Medical College as a substitute for the studies of the first two terms of the Senior year in Union College. This enables medical students to lessen the time of their academic and professional studies by one year.

For tuition charges, see page 92.

ADMISSION

General Conditions

The regular entrance examinations are held on the Thursday and Friday immediately following Commencement, and on the Tuesday, Wednesday and Thursday of the first week of the Fall term, as indicated in the calendar; also, at the opening of any term. Special provision will be made, on application, for June entrance examinations to be held in other places to suit the convenience of applicants. A fee of $5 will be charged for admission to these examinations.

Candidates must be at least sixteen years old, and, as a preliminary to the entrance examinations, they must, on the first day set for examinations (see page 47) present to the President satisfactory testimonials of character, and register for the necessary examinations.

Candidates from other colleges must bring letters of honorable dismissal, and must pass satisfactory examinations, or present acceptable certificates.

Candidates for a degree must enter before the close of the first Senior term.

All candidates will be examined in the English requirements, but in other subjects, Regents' diplomas or certificates from schools approved by the Faculty will be accepted so far as they cover the requirements. Regents' pass-cards will be accepted if they cover all the subjects required in any department. Blank certificates, to be filled out by principals of schools, will be furnished upon application to the Dean. Candidates are requested to take, if possible, the uniform entrance examinations offered by the College Entrance Examination Board. Information concerning the time and place for these examinations can be obtained by writing to *College Entrance Examination Board, Post-Office Sub-Station 84, New York, N. Y.*

Candidates for any other than the Freshman class are examined also in all studies previously pursued by that class.

Requirements for Examination in 1903

I. A. B. COURSE

Candidates for admission to the course leading to the degree of A. B. will be examined in the following subjects:

1.—ENGLISH.

All candidates for admission to the Freshman class will be required to pass a written examination in English, and no candidate will be admitted whose work is seriously defective in spelling, punctuation, grammar, or division into paragraphs.

Questions will be set on topics and extracts drawn from the following books. The first list consists of works to be read carefully with a view to the absorption of the subject matter, *i. e.,* as books are generally read. The second list consists of books to be read with critical care, in annotated editions, and with reference to dictionary, grammar and rhetoric. The questions on this set will relate to literary form and logical structure as well as to substance.

LIST (1) FOR GENERAL READING.

Shakespeare's "The Merchant of Venice" and "Julius Cæsar;" "The Sir Roger de Coverley Papers" in "The Spectator;" Goldsmith's "The Vicar of Wakefield;" Coleridge's "The Rime of the Ancient Mariner;" Scott's "Ivanhoe;" Carlyle's "Essay on Burns;" Tennyson's "The Princess;" Lowell's "The Vision of Sir Launfal;" George Eliot's "Silas Marner."

LIST (2) FOR MINUTE AND CRITICAL STUDY.

Shakespeare's "Macbeth;" Milton's "Lycidas," "Comus," "L'Allegro" and "Il Penseroso;" Burke's "Speech on Conciliation with America;" Macaulay's Essays on Milton and Addison.

Attention is called to the fact that while no examination in grammar or rhetoric, as such, will occur, yet a knowledge of the essential principles of grammar and of the elementary principles of rhetoric is involved in the above requirements.

An acquaintance with the general outline of the development of English literature will also be required. Pancoast's Introduction to English Literature and Halleck's History of English Literature are recommended.

2.—MATHEMATICS.

Arithmetic; Algebra, through Quadratics; Plane Geometry.

In Arithmetic the examination will be on the following subjects: factors and multiples, common and decimal fractions, square root, the more important tables and operations of denominate numbers, percentage and simple interest, compound interest for integral periods only, bank discount, stocks and bonds, and the metric system.

In his preparation in Algebra the candidate should give special attention to factoring, fractional exponents and radicals, and the solution of quadratic equations by factoring and by the formula resulting from the solution of the equation $ax^2+bx+c=o$.

3.—LATIN.

(a) Latin Grammar and Latin Composition (Daniell's "Exercises in Latin Composition," or an equivalent); four books of Cæsar's Gallic War, or Arrowsmith and Whicher's "First Latin Readings" (preferred); six books of Vergil's Æneid; six orations of Cicero; two thousand lines of Ovid, or Sallust's Catiline; the "Roman Method" of pronunciation.

The Grammars of West, Bennett, Lane and Morgan, Harkness (Complete Edition), Allen and Greenough, and Gildersleeve-Lodge are recommended.

(b) Roman History (as in Wolfson), Geography of Roman Empire.

4.—GREEK.

(a) Goodwin's Greek Grammar; Pearson's "Greek Prose Composition," or an equivalent; Xenophon's Anabasis, four books; Homer's Iliad, three books, including Prosody.

(b) Botsford's History of Greece.

(c) The Geography of Ancient Greece.

[The attention of instructors is particularly directed to the student's need of a full and accurate knowledge of the Greek and the Latin Grammar.]

5.—HISTORY OF THE UNITED STATES.

6.—MODERN GEOGRAPHY.

7.—PHYSIOLOGY.

II. PH. B. COURSE

Candidates for admission to the Freshman class in the course leading to the degree of Ph. B. will be examined in the following subjects:

1.—ENGLISH, as for the A. B. Course, page 42.

2.—MATHEMATICS, as for the A. B. Course, page 43.

3.—LATIN, as for the A. B. Course, page 43.

4.—GERMAN.

(a) A knowledge of grammar, comprising declension of nouns, adjectives and pronouns; conjugation of verbs; the rules of syntax and word-order.

(b) Ability to translate at sight a passage of German prose or poetry of ordinary difficulty, and to convert simple English sentences into German. The candidate must have read, concurrently with the work in the grammar, from 300 to 400 pages of prose and poetry from various standard authors. A careful pronunciation and constant drill in speaking German is essential. Two years' work will be necessary to meet this requirement.

5.—HISTORY OF THE UNITED STATES.

6.—MODERN GEOGRAPHY.

7.—PHYSIOLOGY.

III. B. S. COURSE

Candidates for admission to the Freshman class in the course leading to the degree of B. S. will be examined in the following subjects:

1.—ENGLISH, as for the A. B. Course, page 42.

2.—MATHEMATICS, as for the A. B. Course, page 43.

3.—ADDITIONAL MATHEMATICS.

(a) Solid Geometry.

(b) Plane Trigonometry.

4.—PHYSICS.

An elementary knowledge of Physics, such as may be gained by a year's course of study covering Mechanics, Sound, Heat, Light and Electricity. Preparation should include individual laboratory work, attested by a note-book, comprising at least thirty-five exercises, chiefly quantitative.

For recitation work Gage's "Elements of Physics" is recommended as a text-book.

5.—GERMAN, as for the Ph. B. Course, page 44; or Latin, as for the A. B. Course, page 43.

6.—HISTORY OF THE UNITED STATES.

7.—MODERN GEOGRAPHY.

8.—PHYSIOLOGY.

IV., V. and VI. B. E. COURSES.

Candidates for admission to the Freshman class in any of the courses leading to the degree of B. E. will be examined in the same subjects that are required for admission to the B. S. Course, page 45.

Requirements for Examination in 1904 and 1905

IN ENGLISH IN ALL COURSES.

LIST (1) FOR GENERAL READING.

Shakespeare's "The Merchant of Venice" and "Julius Cæsar;" Addison's "The Sir Roger de Coverley Papers" from "The Spectator;" Goldsmith's "The Vicar of Wakefield;" Coleridge's "The Rime of the Ancient Mariner;" Scott's "Ivanhoe;" Carlyle's "Essay on Burns;" Tennyson's "The Princess;" Lowell's "The Vision of Sir Launfal;" George Eliot's "Silas Marner."

LIST (2) FOR MINUTE AND CRITICAL STUDY.

Shakespeare's "Macbeth;" Milton's "Lycidas," "Comus," "L'Allegro," and "Il Penseroso;" Burke's "Speech on Conciliation with America;" Macaulay's Essays on Milton and Addison.

All other requirements as in 1903

ENTRANCE EXAMINATIONS

1903

THURSDAY, FRIDAY, JUNE 11, 12.

TUESDAY, WEDNESDAY, THURSDAY, SEPTEMBER 15-17.

Candidates will present their credentials at the office of the President at 2 P. M. on Monday, Sept. 14, and register for examination.

Only those who register at the appointed time will be admitted to the examinations of the following days.

SCHEDULE OF EXAMINATIONS

First day, Spring; Second day, Fall.

9 A. M.	Arithmetic. Geography. Physiology.	11 A. M. Algebra.	2 P. M. U. S. History. 3 P. M. English.

Second day, Spring; Third day, Fall.

9 A. M.	Latin. Solid Geometry.	11 A. M. German.	2 P. M. Greek. Plane Geometry. Plane Trigonometry.

DEPARTMENTS OF INSTRUCTION

The Greek Language and Literature

ACTING PROFESSOR BENNETT.

Greek is prescribed in the A. B. course throughout the Freshman and Sophomore years. The object kept constantly in view throughout the course is not merely to teach so many works of an unknown tongue, but to instruct and educate the pupil by a system of mental training grounded upon the works of the most noble poets, dramatists, historians and philosophers of the ancient world. To this end the pupil is taught not only to translate into accurate and idiomatic English, to analyze with great care the grammatical construction and to compare it with that of his own tongue, but especially to obtain a thorough knowledge and critical appreciation of the authors selected for his use.

Although there must be a general uniformity in the order in which different authors are read, yet no particular works are assigned to the several terms. The proficiency of each class determines the character of the book to be read. Furthermore, an opportunity is offered to students of the two upper classes to continue their studies in this department, by assigning to them for the three terms of the Junior and Senior years respectively, two hours per week of elective work in Greek. It is not thought advisable to limit any particular subject to any one term; but, as the need of the student is made plain, the attempt will be made to satisfy it. The works presented for consideration are in general these:

FRESHMAN YEAR.

1. Xenophon's Memorabilia of Socrates, Selections; Herodotus, Selections; Homer's Odyssey, Selections; Prose Composition.

SOPHOMORE YEAR.

2. One play each of Aeschylus, Sophocles, and Euripides; Plato's Apology and Crito.

JUNIOR YEAR (ELECTIVE).

3. Aristophanes, Demosthenes, Greek Testament.

SENIOR YEAR (ELECTIVE).

4. Odyssey, Books V—; One thesis each term on an assigned topic connected with Greek Literature; Elementary Lectures in Archæology; Plato.

CANDIDATES FOR HONORS.

5. Candidates for Honors will be required to take all of the elective courses in Greek, to meet two additional hours a week during the Senior year for the study of a prescribed author, and to write a thesis on an assigned topic.

The Latin Language and Literature

PROFESSOR ASHMORE.

The Freshman and Sophomore studies in this department are prescribed in the A. B. and Ph. B. courses. The Junior and Senior courses are elective. The following programme is intended to indicate the general scope of the work of the four classes. Equivalents may be substituted at the discretion of the head of the department.

FRESHMAN YEAR.

1. **Cicero:** Cato Maior. **Livy:** Books I, XXI. **Latin Composition.** Four hours weekly.

SOPHOMORE YEAR.

2. **Horace:** Selected Odes, Satires and Epistles. **Terence:** Adelphoe. **Plautus:** Captivi or Mostellaria. Three hours weekly.

JUNIOR YEAR.

3. **Juvenal:** Principal Satires. Two hours weekly. First Term.

4. **Selected Letters of Pliny.** Two hours weekly. Second Term.

5. **Lectures on the private life of the Romans,** with collateral reading. Two hours weekly. Third Term.

SENIOR YEAR.

6. **Rapid reading of Terence or Plautus.** Two hours weekly. First Term.

7. **Lectures on the monuments and topography of Rome.** Two hours weekly. Second Term.

8. **Lucretius.** Two hours weekly. Third Term.

The Junior courses are open to Seniors, and vice versa.

SPECIAL HONORS IN LATIN.

Candidates must elect all of the courses of the Junior and Senior years and write a thesis of prescribed length upon some topic closely related to their Latin studies.

Modern Languages

ADJUNCT PROFESSOR WILKENS AND MR. MARCH.

The study of modern languages is required of all students.

The primary object is to give students in every course a thorough literary training by means of the study of some of the great masterpieces of French and German literature, and to broaden their mental horizon by acquainting them, through reading and lectures, with the life and thought of the greatest nations of continental Europe.

In the classical course a knowledge of modern languages supplements and completes the linguistic and literary training obtained through the study of languages of the ancient world, and in the scientific and engineering courses the department purposes to give, through a longer and more careful study of the thought and speech of the modern world, a culture as nearly as possible equivalent to that obtained through classical study.

Another purpose is to prepare the student for special work in his chosen department. The instruction given to the classical student is immediately useful in his philological studies, and is also a preparation for more advanced work, both before and after graduation. In the scientific and engineering courses the student gains, early in the course, a knowledge of French and German that enables him to read scientific works in those languages during the later years of his course.

During the Junior and Senior years, electives are offered in Spanish and in the advanced study of French and German, both in reading and conversation.

More advanced courses, leading to special honors in French and German, are also offered to those students who are found qualified to pursue them, by the superior excellence of their work in the required and elective courses.

The English Language and Literature

PROFESSOR TRUAX.

I. ENGLISH LANGUAGE.

1. Anglo-Saxon Prose.—Elements of grammar, and readings in the *Gospels, Aelfric, Aelfred,* the *Chronicles,* and *Wulfstan.* First term Junior. Two hours weekly.

2. Anglo-Saxon Poetry.—Reading of *Battle of Maldon,* or *Brunanburh, Judith,* the *Wanderer,* and portions of *Caedmon* and *Beowulf,* with attention to language, verse, and Anglo-Saxon life and character. Second term Junior. Two hours weekly.

3. Early Middle English.—The chief linguistic features of the Southern dialect are studied in the *Ancren Riwle,* and of the East Midland dialect in the *Ormulum.* Second term Junior (in part). Two hours weekly.

4. English Philology.—A systematic study of the development of the English tongue, based on the linguistic work of Courses 1, 2 and 3. Third term Junior. Two hours weekly.

II. ENGLISH LITERATURE.

5. Chaucer and the Early Poets.—Lectures giving a brief summary of the origin of English literature and its development

prior to the 14th century; study of a manual giving the characteristics of Chaucer and the chief poets of the 14th and 15th centuries, and illustrative readings. The *Prologue,* the *Knightes Tale,* and the *Nonne Preestes Tale* of the *Canterbury Tales* are read in full, and attention is directed to language, verse, literary art, ethical quality, and social life portrayed. Required in A. B., Ph. B. and B. S. courses. Second term Sophomore. Three hours weekly.

6. Shakespeare and the Dramatists.—Lectures and text-book study of the origin and characteristic features of the English drama, and its history to the Restoration, with critical study, literary rather than linguistic, of several of the plays of Shakespeare, selected to represent the growth of his genius, together with interpretative and assigned readings in Marlowe and other leading dramatists. Required in the second term Sophomore of the Engineering, and in the third term Sophomore of the other courses. Two hours weekly.

7. The English Essayists.—A brief survey of the development of English prose, and a series of critical studies of typical essays of *Bacon, Addison, Macaulay, DeQuincey* and *Carlyle.* Required in all courses. First term Sophomore in B. E. course. First term Junior in other courses. Three hours weekly.

8. Prose Fiction and Modern Poetry.—A study of the origin and early development of the novel on the basis of Raleigh, with lectures on later tendencies in fiction, and assigned readings in particular authors, resulting in reports and discussions.

Lectures on the nature and elements of poetry, and critical studies of the principal types produced between the Elizabethan and the Victorian Age. Second term Junior. Required in A. B., Ph. B. and B. S. courses. Two hours weekly.

9. The Great Orators.—Lectures on the art of the orator, and critical study of great political and forensic speeches, English and American, with practice in drawing briefs, and reports on assigned reading. Required in B. S. course. Third term Junior. Two hours weekly.

10. Anglo-Saxon and Middle English Literature.—In connection with the linguistic study in 1, 2 and 3, the life and

literary art of the period are exhibited, by illustrative readings, references and lectures. Elective in A. B., Ph. B. and B. S. courses. Junior year. Two hours weekly.

11. American Literature.—A series of lectures on *Colonial Literature, Franklin, Irving, Emerson, Lowell, Holmes, Bancroft, Parkman, Prescott, Motley, Bryant, Longfellow, Poe, Whittier, Whitman, Brown, Cooper* and *Hawthorne,* together with the discussion of assigned readings. Elective in all courses. First term Senior. Two hours weekly.

12. The Victorian Period in English Literature.—An attempt to estimate the spirit of the literary product of the age as a whole, with special attention to Tennyson, Browning and Matthew Arnold. Other periods, similarly treated, may be substituted for the Victorian. Elective in all courses. Second and third terms Senior. Two hours weekly.

12 a. The Philosophy of English Literature.—A review of the entire history of English literature with the purpose of showing its unity, the logic of its development, the formative influences that generate changes and determine periods, and the relation that literature holds to life. Offered in substitution for a portion of Course 12 in certain years.

12 b. Studies in Literary Criticism.—A survey of the chief points of view from which literature has been regarded by the leading critics, and a discussion of some fundamental standards of judgment. Offered in substitution for a portion of Course 12 in certain years.

Rhetoric and Logic

PROFESSOR HALE.

The work of this department consists largely of written exercises, essays, and orations, criticised by the professor in individual conferences. The class work of the Freshman and Sophomore years is arranged so as to prepare for the Senior and Junior Essays in Exposition and Argument, and the Junior Elective in Argumentation and Debate,

Prescribed Work

FRESHMAN YEAR.

English Composition. Two hours. Second term, all courses. The work consists of exercises in diction.

Constructive Rhetoric. Three hours. Third term, all courses. The subjects taken up are Kinds of Composition and the Paragraph.

SOPHOMORE YEAR.

Constructive Rhetoric. Three hours. First term, A. B., Ph. B. and B. S. courses. The subjects taken up are the Vocabulary and the Theory of Usage, and Figures of Speech.

Logic. Two hours. Second and third terms, A. B., Ph. B. and B. S. courses.

Essays and Orations. Second and third terms, all courses.

JUNIOR AND SENIOR YEARS.

The prescribed work for Junior and Senior years consists of two rhetorical exercises a term for all courses. These exercises will usually be one essay and one oration, although this arrangement may not be strictly held to. One exercise only is prescribed for the third term Senior.

ELECTIVE COURSES

Argumentation and Debate. Two hours. For Juniors. The course gives a good deal of practice in oral debate and the outlines of the theory of argumentation.

History of English Style. Two hours. For Seniors. Lectures on style in the Elizabethan, the classical, and the romantic periods, and special study of some prose authors of the nineteenth century. The authors chosen will vary somewhat from year to year; in 1901-1902 DeQuincey, Newman, and Ruskin were studied.

History and Sociology

PROFESSOR RIPTON.

The work of the department covers three years, beginning with the first term of the Sophomore year. It is designed to give such a general knowledge of History, Economics and Sociology as belongs to a liberal education. At the same time sufficient work is offered in the electives to prepare those students who desire to take up graduate work in these subjects. The instruction is given by text-book, by lectures, and by library references, the students reporting the results of their reading partly during the regular work of the class, and partly in the form of essays. The subjects covered by the courses are in detail as follows:

1. English History. The narrative history of England is taught chiefly, but considerable time is devoted to the industrial, commercial and social history of the country and to the development of the English Constitution. The importance of collateral readings from the English authorities is emphasized. First and second terms Sophomore. Two hours a week. *Required.*

2. French History. Beginning with a brief study of Roman Gaul, the main purpose is to show the growth of the French nation and the working of the different forces which promoted or retarded French unity. The period studied concludes with the year 1789. The history of France from that date to the present is taken up in greater detail in Course 7. Third term Sophomore. Two hours a week. *Required.*

3. Middle Ages, Renaissance and Reformation. The broad outlines of the history of Europe from the beginning of the Christian Era to the Peace of Westphalia, 1648, are considered. Particular attention is given to the study of the mediæval institutions. First, second, and third terms Junior. Two hours a week. *Elective.* (Not given in 1902-3.)

4. American History. A study is made of the period of American discovery and exploration and of the colonial period. The main part of the work, however, begins with an examination of the causes of the American Revolution. The course is guided by text-books and lectures, and much work is done in the library

among the sources and authorities. First, second and third terms Junior and Senior. Three hours a week. *Elective.*

5. French Revolution and Nineteenth Century. This course considers the causes, ideas, and progress of the French Revolution, and the reconstruction of European politics and society produced by the revolutionary and Napoleonic wars. It then takes up an examination of the events and forces which contributed to the unification of Italy and of Germany, and concludes with a brief study of the Eastern Question. The course is designed to give a clear understanding of political affairs as they exist in Europe to-day and the historical processes by which they were brought about. First, second and third terms Senior. Three hours a week. *Elective.*

6. Comparative Politics. A study is made of the state and national systems of the American Government, together with the general duties and powers of the legislative, executive and judicial branches of the same. A comparative study is then made of the principal governments of Europe, with reference especially to the provisions of their present constitutions and the way in which those constitutions have developed and may be amended. The course is completed by a study of International Law with reference especially to origin and development. First, second and third terms Senior. Three hours a week. *Elective.*

In 1902-3, courses 5 and 6 are combined in one five-hour course.

7. Economics. It is the design of this course to give instruction in the leading principles of Economics. While a text-book is used in order to secure more rapid progress, still the views of no school are taught exclusively. By lectures and required collateral reading an attempt is made to present the results of the latest and most approved investigations in the science. The course closes with a series of lectures upon the history of Political Economy. Firse term Senior. Three hours a week. *Required in all courses.*

8. Sociology. In this course the mutual relations of men in society are examined historically, that the student may learn how present conditions have resulted from past experience. Present social forces and needs are considered with the purpose of training

the students to fulfill the demands of good citizenship. The collateral reading and practical sociological investigation is guided throughout the course by lectures. Second and third terms Senior. Three hours a week. *Required in all except Engineering courses.*

Mental and Moral Philosophy

PROFESSOR HOFFMAN.

The course in Philosophy begins with the second term Junior and extends through the entire Senior year. Experimental Psychology and elementary Ethics, the former coming the second and the latter the third term of the Junior year, are required. All the other courses are elective. Instruction in the various studies of the department is usually given by means of lectures, discussions and the use of a text-book.

The course in Experimental Psychology is designed to acquaint the student with the most obvious facts of his mental experience. The chief problems discussed are sensation, localization of functions, memory, conception, the emotions and the will; as far as possible the positions taken up are illustrated and confirmed by actual experiments. The facts of Pathological Psychology are also here briefly considered, especially such abnormal forms of consciousness as aphasia, hypnotism, double personality and insanity.

As Elementary Ethics is a required study, only the outlines of the subject are presented in this course. The history of ethical theories is first briefly reviewed and then the present aspects of the subject are discussed. The relation of Ethics to other sciences is pointed out and much attention is given to the ethical problems involved in such questions as taxation, transportation, corporations, the treatment of criminals, the care of the poor, and the formation and dissolution of the family.

The study of the History of Philosophy begins with the first term Senior year and comes three hours a week for three successive terms. The object of the course is to go over with considerable detail the general field of Philosophy from the earliest times down to our own day, and to present for consideration and discussion the views of the great thinkers of the world upon the validity

of knowledge, the existence of God, the nature of virtue, the foundation of the State and other problems of similar import. Much is made of the historical connection of the different systems for the purpose of impressing upon the mind of the student the successive steps that have been taken in the actual development of thought.

Courses in Advanced Psychology and Advanced Ethics are offered to the Seniors during the first and second terms respectively in which the higher problems suggested in the elementary courses receive more extended treatment.

During the third term Senior the principal studies of this department are: Political and Social Philosophy and the Evolution of Religion. Under this last head the chief ideas of the leading religions of the heathen world are critically examined, their excellences and defects pointed out and a comparison made of them with the special doctrines of the Christian system.

Mathematics

PROFESSOR WRIGHT AND ASSISTANT PROFESSOR EDWARDS.

1. Solid and Spherical Geometry. *Wentworth's Geometry.* Required of Freshmen in the A. B. and Ph. B. courses.

2 a. Algebra. *Wells' College Algebra. Hall and Knight's Algebra.* Freshman required.

2 b. Algebra. The Theory of Equations, including the elements of Determinants. Open only to those who have taken 5 a. Junior elective.

3 a. Plane and Spherical Trigonometry. *Wentworth.* Freshman required.

3 b. Advanced Trigonometry. *Loney's Trigonometry, Part II.* Junior elective.

4 a. Analytic Geometry. *Ashton's Analytic Geometry.* Freshman and Sophomore required.

4 b. Analytic Geometry, advanced course. *C. Smith's Conic Sections.* Junior and Senior elective. Open only to those who have taken 2 b.

4 c. Solid Analytic Geometry. *C. Smith's Solid Geometry.* Junior and Senior elective. Open only to those who have taken 4 b.

5 a. Differential and Integral Calculus. *Taylor's Calculus.* Required of Sophomores in the B. S. course. Junior and Senior elective to others.

5 b. Calculus, advanced course. *Greenhill.* Senior elective. Open only to those who have taken 4 b and 5 a.

6. Differential Equations. *Murray.* Senior elective. Open only to those who have taken 5 b.

Candidates for special honors in Mathematics may take course 4 b, 4 c, 5 b, or 6.

Mechanics and Physics

ASSISTANT PROFESSOR OPDYKE AND MR. WHEELER.

The general course in Mechanics and Physics extends through three terms. The subjects taken up are, in order, Mechanics, Sound, Heat, Light, Magnetism and Electricity. For illustration of the class-room work an extensive collection of modern physical apparatus has been obtained. The text-books used are Wright's Mechanics, Gage's Principles of Physics and Ames's Theory of Physics.

Elective courses in Heat and Light are offered during Senior year. Also an Elective course in Mathematical Physics during Senior year.

A course in Laboratory Physics is required of students in the B. S. and B. E. courses beginning with the third term of Sophomore year, and offered to all Seniors as an elective of two hours a week throughout the year. The phenomena of Mechanics, Sound, Heat, Light and particularly those of Electricity and Magnetism are studied by means of experiments performed by the

students, and the laws which these phenomena involve are established by quantitative measurement. The course is intended as a preparation for further independent work and includes practice in the use of instruments of delicacy and precision. Sabine's Laboratory course in Physical Measurement, Glazebrook and Shaw's Practical Physics and Nichol's Laboratory Manual of Physics are used as text-books.

The course for special honors in Physics extends through three terms. The subjects vary from year to year.

For laboratory fees see page 92.

Chemistry

ASSISTANT PROFESSOR CURTISS.

The chief aim of the instruction in this department is to give the student a sound training in the modern methods of pure science, and to develop thereby accurate observation, logical reasoning, and the power of forming correct judgments on observed facts. The courses are intended quite as much as a liberal culture training as for the practical use that may afterward be made of the knowledge gained. The student desiring to specialize in Chemistry, or to take up the study of Medicine, Biology, Geology, or other branches of Natural Science, will find the courses, and the exact training required, of the greatest value.

All courses are open as electives.

1. General Chemistry. Three hours a week for one year. Recitations, lectures and two hours in the laboratory. In this course the student studies the commoner elements and their compounds, and the fundamental laws and theories connected with the science. The subject matter of the recitations is illustrated by charts, and by experimental lectures, the student repeating as many of the experiments as is practicable the same day, in the laboratory, being taught to observe carefully, reason out his own results, and to keep careful, accurate notes of all work performed. Required of all except candidates for the A. B. degree, and elective with them in Junior and Senior years.

Text-books: Remsen's Introduction to the Study of Chemistry,

Briefer Course. Remsen's Chemical Experiments. The Advanced Course, by the same author, is recommended for collateral reading.

1 a. General Chemistry. Two hours a week of laboratory work, to be taken only in conjunction with Course 1, and intended for students who wish to go more deeply into the subject.

2. Qualitative Analysis. This course consists of six hours per week, for one year, in the Laboratory, in connection with quizzes and informal lectures given usually in the Laboratory. In this work the student familiarizes himself further with the more important elements, their compounds and reactions. The knowledge thus gained is classified and systematized, the elements separated into groups, and eventually each member of these groups is separated and identified by appropriate tests. The worker is thus led on from a study of known substances to complex mixtures of unknown composition, where the knowledge first gained of chemical properties and reactions is practically tested. No new work is allowed to be taken up until a successful result, proved to be correct, is obtained.

Text-books: Dennis and Whittlesey's Laboratory Guide in Qualitative Analysis, and Fresenius' Qualitative Analysis; Remsen's Inorganic Chemistry, Advanced Course, for reference. Course 2 elective after Course 1.

2 a. Same as course 2. Six hours' extra in the laboratory. Elective.

3. Quantitative Analysis. This course consists of six hours per week for one year in the Laboratory, as in 2. The student studies systematically the various gravimetric and volumetric methods of analysis first of simple, then of complex chemical compounds, mineral substances, natural products, etc., etc. A thorough course in Elementary Organic Analysis is also included. Course 3 is elective after 1 and 2. This course is especially valuable in training one in that art of delicate manipulation so essential to success in many departments of scientific work.

3 a. Same as 3, with an additional six hours in the laboratory. Texts: Fresenius' Quantitative Analysis, and various works of reference in the library.

4. Organic Chemistry. Three hours a week for one year. Recitations and illustrated lectures. A systematic study of the more important typical members of the Fatty and Aromatic Series with reference to their occurrence in nature and their economic uses. A thorough exposition of the fundamental principles and most recent theories of Organic Chemistry is included. Elective after Course 2. Text-books: A. Bernthsen's Organic Chemistry. Other more extensive works will be assigned for reference.

5. Organic Chemistry. Three or six hours a week in the laboratory. Here a study of the methods of making typical organic compounds is undertaken, as well as the means employed to purify and test them. This course is preparatory to research work in Organic Chemistry. Open as an elective after, or in conjunction with, Course 4.

Graduate work in this department is offered on the subjects outlined in the above courses, also research work on selected subjects in Organic Chemistry.

For laboratory fees see page 92.

Biology and Geology

PROFESSOR STOLLER.

1. Elementary Biology.—This course is intended to give the student a knowledge of living plants and animals and to afford mental training in the study of nature. The work begins with the study of protoplasm, cells, tissues and organs, as parts common to plants and animals; then a series of types, first of animals and afterward of plants, is carefully studied on the basis of morphology, physiology and development. One (or two) hours of recitation and four (or two) hours of laboratory work per week throughout the year. Required of Sophomores in the B. S. course.

2. General Biology.—This course is more advanced than the preceding, and while the observational study of a series of types is made the basis of the work the main purpose is to afford the student a grasp of the ideas of biological science in their general philosophical relations. Recitations and laboratory work, count-

ing as three hours in the first term, two hours in the second and three hours in the third term. Required of Juniors in the Ph. B. course.

3. General Principles of Zoology.—The aim of this course is to use the data of zoology for their worth as contributing to liberal culture. The more general facts and principles of animal structure, function and development are reviewed and considered in their relation to the study of man. The scientific evidences of organic evolution and the theories of evolution of various authors are considered. Recitations and lectures, three hours per week, third term. Required of Juniors in the A. B. and B. S. courses.

4. Animal Morphology.—This course is adapted for students who wish a somewhat advanced knowledge and training in biology, especially as a preparation for teaching or for the medical profession. The work is mainly in the line of comparative anatomy and includes the dissection of several vertebrate types in detail. Some time is given to elementary histology and embryology, involving the technique of section-cutting, etc. Accompanying the laboratory work is the reading of a text on general zoology. Six hours of laboratory work per week throughout the year.

5. Bacteriology.—Students who have elected Course 4 may be permitted to take, in the third term, elementary practical bacteriology in place of a part of the anatomical work.

6. Geology.—The instruction in this course is adapted primarily to the study of the science as a branch of liberal culture, but enough practical work is included to afford a foundation for special study or for teaching. The work begins with the examination of the more common minerals and rocks and passes to the study of structural geology, one or two field excursions being made. The principles of dynamical geology are then considered, after which the time is given to systematic geology and paleontology. In the third term the work is field work, supplemented by reading. The geological formations readily accessible from Schenectady are inspected and readings from the State geological reports are made. Three hours in the first term, two in the second and three in the third. Elective to Juniors and Seniors. Until

further notice this course will be given on alternate years. It will be given in the year 1903-4.

7. Economic Geology.—In this course, after a brief study of the principles of dynamical and structural geology, the work is related to the occurrence and distribution in the United States of building stones, mineral ores, coal and other economic products. Recitations, lectures and some laboratory work, two hours a week, first Senior term. Required of engineering students.

Physiology and Physical Education

DR. TOWNE.

Human Anatomy, Physiology and Physical Education are required in all courses. Physiology is taken up in the Freshman year and consists of recitations illustrated by dissections from some of the lower animals. A thorough study of the human body is made, so that the student is more able to understand the benefits resulting from systematic bodily exercise.

The course in the gymnasium is so arranged as to give a practical knowledge of the different apparatus pertaining to physical training. Commencing with light work, consisting of free gymnastics, club, dumb-bell and wand exercises, the course leads through a graded series, involving heavier work as the student becomes fitted for it.

After the study of physiology, and gymnasium work of the previous year, the student is prepared for the study of Physiology of Exercise, in which course the results of exercise, as to its effects on the body, are taken up and discussed from a physiological standpoint.

It is the aim of the department to give the student such a training in the methods of Physical Education that he may have a comprehensive knowledge of the subject, and to secure health, vigor and such harmonious development of the body as will fit it to resist disease, and prepare it for efficient service, both now and later in life.

A thorough physical examination of each student is made in the fall, and the measurements are outlined on charts, so as to show

the parts below the normal development, for which special exercises suited to the health and physical condition of each individual are prescribed. In the Spring measurements are taken again and the improvement noted.

In connection with the college is a large gymnasium well equipped with new apparatus and thoroughly adapted to the purpose of providing excellent opportunities for physical training. It is open from 7 A. M. to 6 P. M. during the college year, to all classes for voluntary work. All kinds of athletic sports are encouraged, as much as possible, under the advice and guidance of the department.

LECTURES.

It is the policy of the College to provide its students with the advantages of frequent lectures by specialists in the various departments of knowledge.

In addition to these Professor William Wells, LL. D., delivers each year a course of lectures on current history. The range and importance of these lectures are indicated by the following list of subjects: "Cuba, Mexico and Central America," "German Universities and German Politics," "The Pacific Slope and Its History," "Modern France," "Alaska and the Yellowstone Park," "Greece and Turkey," "Egypt and the Nile," "Northern Africa and Moorish Spain," "The Scandinavian Norseland," "All the Russias," "The Story of the Canadas," "The Schools and Scholars of the Germany of To-day," "Idiomatic Analogies of the Principal European Tongues," "Our West Indian Acquisitions," "The Isles of the Caribbean Sea," "Personal Memories of Some of the Most Distinguished Professors of the German Universities in My Day," "Original Research as Primal Aim of the German Universities."

THE LIBRARY

The library is open every week day from 8 A. M. to 12:30 P. M., from 2 P. M. to 6 P. M., and from 7 P. M. to 9 P. M. It occupies at present the building erected for it by the widow of the late F. H. Powers, of Philadelphia, but will be moved within the year into Nott Memorial Hall. This building is now being arranged for the reception of books by means of the gift of thirty-five thousand dollars from Mr. Andrew Carnegie. Among its special collections are the excellent engineering and scientific library of the late Professor Gillespie, the collection of mathematical works made by the late John Patterson, of Albany, and the library of the late Hon. Henry J. Cullen, of the class of 1860. The income from a bequest of five thousand dollars left by the late Lemon Thomson, Esq., of Albany, of the class of 1850, is devoted to the purchase of books on American subjects, especially history and political science. An alcove, known as the "Thomson Alcove," is reserved for these books. By the will of the late Rev. Oscar Blakeslee Hitchcock, of the class of 1852, a bequest of upwards of thirty thousand dollars was left to the College for the purchase of books, manuscripts, etc. The librarian and his assistants are always ready to aid the student in his study and investigation, and to furnish information regarding the direct personal use of indexes, catalogues and other library means.

In the periodical reading room of the library will be found the current issues of about seventy-five of the most important magazines, reviews, periodicals and newspapers, both American and foreign, as well as the transactions of a number of the learned societies and organizations.

Any student is allowed to withdraw books from the library upon making a deposit of five dollars, which can be taken up at any time.

THE NATURAL HISTORY MUSEUMS

PROFESSOR STOLLER, CURATOR.

BIOLOGICAL MUSEUM.

In Zoology, the local fauna is represented by a considerable collection of mounted birds, by a number of skulls, skeletons and mounted specimens of mammals, and by alcoholic specimens of reptiles and fishes. In the department of invertebrates the collections of marine animals made by Dr. Harrison E. Webster are extensive, including sponges, corals, worms, crustacea and molluscs, the total number of species represented being over 5,000. The Wheatley collection of shells presented by E. C. Delavan, Esq., consists of 8,000 specimens.

The Botanical collections include a nearly complete set of local flowering plants, the work of Professor Jonathan Pearson. To this there has since been added a complete set of the ferns and fern allies of Schenectady county.

The flora of the United States is further represented by collections from Virginia, the Red River region of the southwest and those made by Dr. Nevins in Alabama. The lower cryptogams are represented by an extremely valuable collection of 2,300 specimens of fungi, the gift of Mr. J. B. Ellis.

The Herbarium also includes a considerable number of foreign plants, including representative collections from Germany, Spain, Asia Minor and England, as well as some specimens from Iceland, Norway, France and Switzerland. They have been sorted and distributed in a single series following the latest accepted sequence, that of Engler and Prantl's "Natürliche Pflanzenfamilien," making the entire collection of some 8,000 or 10,000 specimens readily accessible for reference and study.

GEOLOGICAL MUSEUM.

In Mineralogy, the Wheatley collection of minerals given by E. C. Delavan, Esq., which is labeled according to the system of Dana, contains 4,000 specimens, many of which represent the more valuable forms.

In Geology, there is a general collection of rocks and minerals, comprising some 3,000 specimens; and a considerable collection of Paleozoic and Mesozoic fossils.

The collections may be grouped under the three following heads:

I. A collection of rocks and minerals in part given by the U. S. National Museum.

II. A collection of rocks and fossils from the Carboniferous, Permian and Cretaceous systems of the United States, deposited by the United States and Kansas Geological Surveys, which contains the type material described in the classification of the American Permian.

III. Rocks and fossils from the New York formations, principally from the Lower and Upper Silurian and Devonian systems.

The collections made by the geological department under the direction of Professor C. S. Prosser so increased the museum that there is plenty of material now available for the careful study of the Paleozoic and Mesozoic geology of the United States. A systematic collection of the Paleozoic rocks and fossils, principally from the New York formations, has been arranged in the north gallery of the museum.

ORDER AND PROPORTION

OF STUDIES

FOR THE YEAR 1902-1903

A. B. COURSE.

FRESHMAN YEAR

First Term.

Hours per week.

4 Greek.
4 Latin.
4 Solid Geometry.
3 French.
2 Physiology.
1 Gymnastics.
Greek Prose Composition.
Latin Prose Composition.

Second Term.

4 Greek.
4 Latin.
4 Algebra.
3 French.
2 Rhetoric.
1 Physiology.
1 Gymnastics.
Greek Prose Composition.
Latin Prose Composition.

Third Term.

4 Greek.
4 Latin.
3 French.
3 Rhetoric.
3 Trigonometry.
1 Gymnastics.
Greek Prose Composition.
Latin Prose Composition.

A. B. COURSE.

SOPHOMORE YEAR

First Term.

Hours per week.

3 Greek.
3 Latin.
3 Rhetoric.
3 Analytic Geometry.
3 German.
2 History.
1 Hygiene.

Second Term.

3 Greek.
3 Latin.
3 German.
3 English Literature.
2 History.
2 Logic.
One Essay.
One Class Oration.

Third Term.

3 Greek.
3 Latin.
3 German.
2 English Literature.
2 History.
2 Logic.
One Essay.
One Class Oration.

A. B. COURSE.

JUNIOR YEAR

First Term.

Hours per week.

4 Mechanics.
3 German.
3 English Literature.
1 Rhetoric.
7 Elective.*

Second Term.

3 Psychology.
3 Physics.
2 German.
2 English Literature.
1 Rhetoric.
7 Elective.*

Third Term.

3 Biology.
3 Physics.
3 Ethics.
1 Rhetoric.
7 Elective.*

* For list of Electives, see pages 83, 84.

A. B. COURSE.

SENIOR YEAR

First Term.

Hours per week.

3 Economics.

1 Rhetoric

13 Elective.*

Second Term.

3 Sociology.

1 Rhetoric.

13 Elective.*

Third Term.

3 Sociology.

1 Rhetoric.

13 Elective.*

* For list of Electives, see pages 84-86.

PH. B. COURSE.

FRESHMAN YEAR

First Term.

Hours per week.

4 Latin.
4 Solid Geometry.
3 German.
3 French.
2 Physiology.
1 Gymnastics.
Latin Prose Composition.

Second Term.

4 Latin.
4 Algebra.
3 German.
3 French.
2 Rhetoric.
1 Physiology.
1 Gymnastics.
Latin Prose Composition.

Third Term.

4 Latin.
3 Rhetoric.
3 Trigonometry.
3 German.
3 French.
1 Gymnastics.

PH. B. COURSE.

SOPHOMORE YEAR

First Term.

Hours per week.

3 Latin.
3 Rhetoric.
3 Analytic Geometry.
3 German or French.
3 Chemistry.
2 History.
1 Hygiene.

Second Term

3 Latin.
3 German or French.
3 English Literature.
3 Chemistry.
2 History.
2 Logic.
One Essay.
One Oration.

Third Term.

3 Latin.
3 German or French.
3 Chemistry.
2 English Literature.
2 History.
2 Logic.
One Essay.
One Oration.

PH. B. COURSE.

JUNIOR YEAR

First Term.

Hours per week.

3 Biology.
3 English Literature.
4 Mechanics.
1 Rhetoric.
7 Elective.*

Second Term.

2 Biology.
3 Physics.
3 Psychology.
2 English Literature.
1 Rhetoric.
7 Elective.*

Third Term.

3 Physics.
3 Biology.
3 Ethics.
1 Rhetoric.
7 Elective.*

* For list of Electives, see pages 83, 84.

PH. B. COURSE.

SENIOR YEAR

First Term.

Hours per week.

3 Economics.
1 Rhetoric.
13 Elective.*

Second Term.

3 Sociology.
1 Rhetoric.
13 Elective.*

Third Term.

3 Sociology.
1 Rhetoric.
13 Elective.*

* For list of Electives, see pages 84-86.

B. S. COURSE.

FRESHMAN YEAR

First Term.

Hours per week.

3 French.
5 Algebra.
3 German.
3 Chemistry.
2 Physiology.
1 Gymnastics.

Second Term.

3 French.
2 Trigonometry.
2 Analytic Geometry.
3 German.
3 Chemistry.
2 Rhetoric.
1 Physiology.
1 Gymnastics.

Third Term.

3 French.
3 Rhetoric.
4 Analytic Geometry.
3 German.
3 Chemistry.
1 Gymnastics.

B. S. COURSE.

SOPHOMORE YEAR

First Term.

Hours per week.

3 German or French.
3 Rhetoric.
5 Calculus.
3 Biology.
2 History.
1 Hygiene.

Second Term.

3 English Literature.
5 Mechanics.
2 Logic.
3 Biology.
3 German or French.
2 History.
One Essay.
One Oration.

Third Term.

2 English Literature.
5 Physics and Physical Laboratory.
3 Biology.
3 German or French.
2 History.
2 Logic.
One Essay.
One Oration.

B. S. COURSE.

JUNIOR YEAR

First Term.

Hours per week.

3 English Literature.
5 Physics and Physical Laboratory.
1 Rhetoric.
8 Elective.*

Second Term.

3 Psychology.
2 English Literature.
3 Astronomy.
1 Rhetoric.
8 Elective.*

Third Term.

3 Ethics.
3 Biology.
2 English Literature.
1 Rhetoric.
8 Elective.*

* For list of Electives, see pages 83–84.

B. S. COURSE.

SENIOR YEAR

First Term.

Hours per week.

3 Economics.
1 Rhetoric.
13 Elective.*

Second Term.

3 Sociology.
1 Rhetoric.
13 Elective.*

Third Term.

3 Sociology.
1 Rhetoric.
13 Elective.*

* For list of Electives, see pages 84-86

General List of Electives.

[For limiting conditions, see statements of respective departments.]

JUNIOR YEAR

First Term.

Hours per week.

2 Greek.
2 Latin,—Plautus.
2 Anglo-Saxon.
3 German.
3 French.
2 Theory of Equations, or Calculus.
3 American History.
2 European History.
2 Advanced Rhetoric,—Argumentation.
3 Chemistry. (For A. B. Course.)
3 Qualitative Analysis (2).
3 Qualitative Analysis (2 a).
3 General Geology.

Second Term.

2 Greek.
2 Latin,—Juvenal.
2 Anglo-Saxon and Early Middle English.
3 German.
3 French.
2 Advanced Trigonometry, or Calculus.
3 American History.
2 European History.
2 Advanced Rhetoric,—Argumentation.
3 Chemistry. (For A. B. Course.)
3 Qualitative Analysis (2).
3 Qualitative Analysis (2 a).
3 General Geology.

Third Term.

2 Greek.
2 Latin,—Lectures, Private Life of Greeks and Romans.
2 English Philology.
3 German.
3 French.
2 Advanced Rhetoric,—Argumentation.
3 American History.
2 European History.
3 Chemistry. (For A. B. Course.)
3 Qualitative Analysis (2).
3 Qualitative Analysis (2 a).
3 General Geology.

General List of Electives.

[For limiting conditions, see statements of respective departments.]

SENIOR YEAR

First Term.

Hours per week.

2 Greek.
2 Latin,—Lucretius.
3 Spanish.
2 German or French.
2 American Literature.
2 History of Thought on Rhetoric and Style.
2 Advanced Calculus.
2 Mathematical Physics.
2 Physical Laboratory.
3 Quantitative Analysis (3).
3 Quantitative Analysis (3 a).
3 General Geology.
3 Comparative Politics.
3 European History.
3 History of Philosophy.
3 Advanced Psychology.
3 Invertebrate Morphology.

General List of Electives.

[For limiting conditions, see statements of respective departments.]

SENIOR YEAR

Second Term.

Hours per week.

2 Greek.

2 Latin,—Lectures, Monuments of Greece and Rome.

3 Spanish.

2 German or French.

2 The Victorian Period in English Literature.

2 History of Thought on Rhetoric and Style.

2 Advanced Calculus.

2 Mathematical Physics.

2 Physical Laboratory.

3 Quantitative Analysis (3).

3 Quantitative Analysis (3 a).

3 General Geology.

3 Vertebrate Anatomy.

3 Comparative Politics.

3 European History.

3 History of Philosophy.

3 Advanced Ethics.

General List of Electives.

[For limiting conditions, see statements of respective departments.]

SENIOR YEAR

Third Term.

Hours per week.

2 Greek.

2 Latin,—Teachers' Course, or Introductory Course in Epigraphy.

3 Spanish.

2 German or French.

2 Philosophy of English Literature, or English Literary Criticism.

2 History of Thought on Rhetoric and Style.

2 Differential Equations.

2 Mathematical Physics.

2 Physical Laboratory.

3 Chemical Laboratory.

3 General Geology.

3 European History.

3 International Law.

3 Evolution of Religion.

3 History of Philosophy.

3 Comparative Vertebrate Anatomy.

THE

CURRICULUM

OF THE

B. E. COURSES

See pages 137–145.

GENERAL REGULATIONS

Registration.—Every student must report at the Registrar's office at the beginning of each term and register college or local residence. Any change of residence during the term must be reported at once, in conformity with the regulation made by the Treasurer's office.

Residence.—Students are not allowed to change their college rooms during the term without permission of the Treasurer; for every change the sum of two dollars is charged. Students must conform to college rules regarding keys.

Reports.—A daily record of attendance at class and chapel and of scholarship is kept and is transmitted at the close of each term, or more frequently, to the student's parent or guardian.

Standing.—There are four grades of scholarship:—from 9 to 10 inclusive, first grade; from 8 to 8.9, second grade; from 7 to 7.9, third grade; from 6 to 6.9, fourth grade. A student who receives a mark of 4 to 5.9 is reported as conditioned; below 4, as failed. In the mathematical studies of the engineering course the sustaining mark is 7, and any mark below 5 indicates failure.

A student who is reported as having failed in any subject must take that subject again in class.

Those receiving the three highest marks for the whole course in the Engineering Department and the seven highest marks in the other departments are entitled to appointment as Commencement Orators.

Absences in General.—Absences are recorded as of three kinds—permitted, excused and unexcused. No one but the President or Dean can authorize the record of an absence as permitted.

Absences are entered (in every course) against a student from the beginning of a term until he reports his return to the Registrar. A like report is required after absence because of sickness or permission.

Class-room Absences.—Students will be allowed, each term, as many absences without excuse, in any subject, as there are recitations per week in that subject.

After this limit has been reached, each additional unexcused absence will be marked as a failure in recitation, and one or more excused absences will subject the student to a special preliminary examination before he can proceed to his regular examination.

After a number of unexcused absences equal to three weeks of recitations in any subject, the student will not be allowed to continue his work in that subject, but must take it with the succeeding class.

No excuse will be granted except for protracted illness, or for reasons in every way exceptional.

This rule does not apply to examinations, or to recitations just before or after any vacation or recess, or to any class as a whole at any time, and is not to be interpreted as remitting any part of the total work of the term.

Chapel Absences.—Ten absences without excuse will be allowed each term. All absences after the first ten lower the standing at the rate of one unit for every two absences.

No absences will be excused except for protracted illness or for reasons in every way exceptional.

In the determination of a student's general standing marks for chapel attendance are counted as the equivalent of a one hour per week recitation. They affect the granting of scholarships and the selection of honor men.

Conditions.—No student who has any conditions unsatisfied at the close of the first condition examination of the college year will be permitted to continue with his class without the express authorization of the Faculty. Conditions not removed at the next conditions examination held after their imposition, must be made up in class at the first opportunity, and this work shall take precedence of the regular work in case of conflict in the schedule. No Senior who has failed to make up all his back work by the end of the second term of Senior year can be recommended for a degree, except by special vote of the Faculty.

Examinations for the removal of conditions occur on the first Saturday of the Fall term, and on the first Saturday in December, March and May, as indicated in the College calendar.

Students who have been excused from any term examination may be examined later at the option of the instructor, but such examination cannot be postponed beyond the first condition examination. A failure to pass will be regarded as a condition which must be made up at the next following conditions examination.

A failure to report at any appointed examination will be regarded as a trial unless previously excused.

Irregular Students.—Irregular Students have no class relation, or class privilege; they are debarred from competition for prizes and from the attainment of special honors.

Changes of Course.—Students are not permitted to pass from one course to another, or to take any studies out of their regular order, without the specific authorization of the Faculty.

The evidence that a student's continuance in college is resulting in no advantage to himself, or in harm to others, will occasion his separation from the institution.

EXPENSES

Matriculation fee	$ 5 00
Tuition, per term	25 00
Room rent, per term, North College.....$13 50 to	20 00
South College, per term	20 00
Incidental fee, for maintenance of public rooms, use of library, gymnasium, etc., per term	8 00
Chemical laboratory fees:	
Required course, per term	6 00
Elective courses, per term	13 00
Electrical engineering laboratory fee, per term..$2 00 to	10 00
Biological laboratory fees:	
Elective courses, per term	6 00
Required courses, per term	2 00
Physical laboratory fees:	
Elective courses, per term	5 00
Required courses, per term	2 00
Conditions examination fee	2 00
Fee for certificate of work done	2 00
Fee for certificate of graduation	1 00
Graduation fee, including diploma	15 00

Students who take part of their Senior year's work at the Albany Medical College, as provided on page 40, are charged $125 for the year's tuition, $50 to be paid to the Treasurer of Union College, and $75 to the Treasurer of the Albany Medical College.

Tuition is due on the first day of each college term.

Students must conform to the rules of the Treasurer's office regarding registration at the opening of each term, and will not be admitted to any classes or laboratories until the required fees are paid.

No deductions are made because of absence from college.

No degree, certificate or dismissal will be given to any student until his bills are paid.

Board can be procured for $3 to $4 a week. The total expense of tuition, room, text-books, board, lights, washing, etc., during the three terms, is from $275 to $325.

SCHOLARSHIPS

Funds given especially for this purpose enable the College to offer aid to a number of students each year, as follows:

General Scholarships.

Scholarships covering a part or the whole of tuition charges are granted to students upon the following conditions:

1. The declaration of a purpose to remain in Union College until graduation. (Credentials necessary for admission to another college will not be given to any scholarship student until he has repaid to the college treasury the full amount of scholarship aid received.)

2. An acknowledgment that the aid received is regarded as a debt of honor to be paid as soon as possible after leaving college.

3. The presentation of satisfactory evidence of financial need.

Scholarship aid will be withdrawn temporarily upon the failure of the student to be sustained in any subject, or upon his failure to maintain an average grade of eighty per cent. in the studies of any term, and after it has been withdrawn for three successive terms it will not be renewed.

Any serious breach of college discipline, evidence of moral delinquency, or repeated unnecessary expenditures will also result in the withdrawal of scholarship aid.

Application blanks will be provided by the President or Dean upon request.

John David Wolfe Memorial Scholarships.

The income of a Fund of Fifty Thousand Dollars established by the generosity of Miss Catharine Lorillard Wolfe, is designed to aid students from the Southern States.

The scholarships are governed by the conditions named above.

Application blanks will be provided by the President or Dean upon request.

Levi Parsons Scholarships.

A generous benefaction by the late Hon. Levi Parsons, of Gloversville, N. Y., maintains several scholarships in each class, yielding about one hundred and fifty dollars a year, each; this provides for tuition, room-rent and a money payment of $20 per term.

Among applicants, preference is given:

1st, to blood relatives of the Founder, bearing his name and living in the county of Fulton, Montgomery or Hamilton, in the State of New York, and especially to those bearing his name and living in Gloversville or Johnstown, Fulton county.

2d, to applicants living in the following places according to the following order:

1. The city of Gloversville, Fulton county.
2. The city of Johnstown.
3. The township of Johnstown.
4. The county of Fulton.
5. The adjoining counties of Montgomery and Hamilton.
6. To blood relatives living in any other part of the United States.

Nomination to scholarships is made by the Board of Directors of the Gloversville Free Library; and the nominees must pass satisfactory examinations at the College. Applications are received by the Directors of the Gloversville Free Library, Gloversville, N. Y.

These scholarships are governed by the conditions named on page 94.

Union School Scholarships.

These scholarships are given only to graduates of the Union Classical Institute in Schenectady who are sons or wards of residents. They must bring from the Principal a certificate of preparation for college and also one of abstinence, during the course, from tobacco and spirituous liquors, and they must sign a like pledge for their college course. They receive a remission of one-half the tuition fee. In addition to maintaining their pledge, holders of Union School scholarships are subject to the general conditions named on page 94.

R. C. Alexander Prize Scholarship.

The sum of four thousand dollars has been given in memory of the late Robert Carter Alexander, of the class of 1880, and a life trustee of the College, to be devoted to the establishment of a scholarship for the encouragement of classical studies.

The income of this fund, amounting to two hundred dollars per year, will be awarded as a prize scholarship upon the conditions named below.

Conditions.

1. Candidates must be students in the Classical course and of approved moral character.

2. They must be free from conditions, and must have obtained an average of at least eighty per cent. in the studies of the first two terms of the Freshman year.

3. They must pass successfully a special examination at the close of the Freshman year in each of the following subjects: Latin, Greek, Mathematics, English Composition, and either French or German. These examinations will be based upon the work of the Freshman year.

4. The award will be made to the candidate obtaining the highest general average in these examinations and in all the previous work of his college course.

5. The Prize Scholarship will be forfeited upon evidence of moral delinquency or upon failure to maintain an average grade of ninety per cent. in the work of any subsequent term. The scholarship, once lost, cannot be regained, but will be awarded upon the above conditions to a student in the next entering class.

6. All questions pertaining to the administration of this scholarship will be determined by a committee composed of the President of the College, the Chairman of the Scholarship Committee of the Faculty, and a member of the Board of Trustees.

PRIZES

Blatchford Oratorical Medals.

The Hon. Richard M. Blatchford, LL. D., of New York city, founded oratorical prizes, consisting of two gold medals of the value of the interest on $1,000, which are given to the two members of the graduating class who deliver at Commencement the best orations, "regard being had alike to their elevated and classical character and to their graceful and effective delivery." These medals are awarded by a committee appointed by the Trustees and are presented at the close of the exercises.

Warner Prize.

The Hon. Horatio G. Warner, LL. D., of Rochester, N. Y., founded an annual prize consisting of silver plate of the value of $28 to be presented at Commencement to the "graduate of Union College, Classical course, who shall reach the highest standing in the performance of collegiate duties, and also sustain the best character for moral rectitude and deportment, without regard to religious practice or profession." The prize is awarded by the Faculty.

Ingham Prize.

The Hon. Albert C. Ingham, LL. D., of Meridian, N. Y., founded an annual prize of the interest on $1,000 (in the form of plate or medal or money, or both medal and money, as preferred), to be awarded at Commencement to that Senior connected with the College for not less than two years who shall offer the best essay on one of two assigned subjects in English Literature or History.

The essay must be typewritten and must contain not less than 4,000 nor more than 4,500 words. Its signature (fictitious) and the writer's real name must be enclosed in a sealed envelope; the signature and the name of the prize being given on the outside. The essay with the note must be presented by noon on the fifteenth day of May.

Allen Essay Prizes.

The Hon. William F. Allen, LL. D., of Oswego, N. Y., established a fund of $1,000, the interest of which is devoted to prizes for the best three essays on any subject, submitted by members of the Senior class.

The essay must be typewritten and must contain not less than 2,500 nor more than 3,000 words, and must be signed and presented (with note as in the case of the Ingham Essay) by noon on May 15th. The prizes are awarded at Commencement.

R. C. Alexander Prize for Extemporaneous Speaking.

A prize of $50 in money is awarded to that member of the College who shall deliver the best extemporaneous speech at a public competition to be held in Commencement week in each year. The award is made by a committee appointed by the donor, and is based on the following considerations: (1) The appropriateness and correctness of the subject matter; (2) the logical force of the argument; (3) the excellence of the style; (4) the grace and effectiveness of the delivery. All students in regular standing are eligible. The number of competitors is, however, limited to ten.

Oratorical Prizes.

Prizes are presented at Commencement to the two Juniors and the two Sophomores who deliver the orations best in composition and delivery on the occasion of Prize Speaking in Commencement week. Four Juniors and four Sophomores are selected for this competition by a Committee of the Faculty on the fifteenth of April. Candidates must be in full standing on appearance before the Committee.

Allison-Foote Prize.

Founded by George F. Allison, of New York city, and Wallace T. Foote, of Port Henry, N. Y., for the encouragement of debate in the Literary Societies. The prize consists of $100 in cash, and is to be awarded as the result of a public competition between representatives of the Adelphic and Philomathean Literary Socie-

ties. Fifty dollars will be awarded to the society presenting the strongest argument. The remaining $50 will be awarded to the debater who makes the best single speech, regardless of his society relations. Contestants must have engaged in at least ten debates in their respective societies during the college year immediately preceding. All further details are to be left to the determination of a committee consisting of the President, the Dean of the College, and the Professor of Rhetoric.

John K. Porter Memorial Scholarships.

A fund given by Mrs. John K. Porter, in memory of her husband, is designed to assist students who, after graduating from college, pursue the study of law. The fund provides, at present, for three Scholarships of ninety dollars each. The awards will be made at Commencement to Seniors chosen by the Faculty.

Gilbert M. Speir Memorial Scholarship.

A fund given by Mrs. Glover C. Arnold, in memory of her father, the late Judge Gilbert M. Speir, provides another Scholarship for students of law who go from Union College to the Albany Law School, another department of Union University.

The sum of ninety dollars will be awarded at Commencement to the Senior chosen by the Faculty, the choice being made on the basis of excellence in historical studies.

Applicants for Law School scholarships must register at the College office by May 1st of Senior year.

Daggett Prize.

In 1899 Miss E. Josephine Daggett bequeathed to Union College the sum of $1,000, the interest of which is devoted to a prize for conduct and character without respect to scholarship, to be given at Commencement to a Senior who shall have passed through a full course of four years at the college.

DEGREES AND HONORS

Degrees.

The degrees of the college are conferred in harmony with a resolution of the Board of Trustees, which says: "The successful completion of the Classical course [Course 1, page 39] shall entitle the student to the degree of Bachelor of Arts; of the Latin-Scientific course [Course 2, page 39] to the degree of Bachelor of Philosophy; of the Scientific course [Course 3, page 39] to the degree of Bachelor of Science; of one of the Engineering courses [Courses 4, 5, 6, pages 39 and 40] to the degree of Bachelor of Engineering." The candidate for a degree must have entered college before the close of the first Senior term, must have paid all dues to the College Treasurer, and returned all books borrowed from the Library. He must also attend the conferring of Degrees, or be expressly excused therefrom.

The degree of Master of Arts or of Master of Science will be given to graduates of Union College who have been registered as candidates for the degree not less than two years, have completed definite courses of advanced study in two departments, and have submitted a satisfactory thesis and passed satisfactory examinations. The total amount of work done is intended to be the equivalent of one year of resident study.

A year of resident study in any non-professional graduate school, approved at the time of registration by the two departments concerned, will be accepted instead of the two years' study above mentioned on fulfilment of the same conditions regarding thesis and examinations.

Each candidate for this degree must register his name, address, and the two departments chosen, with the Dean of the college not later than the fifteenth of October of the year for which he desires registration.

The thesis must be presented to the Dean by May 1st for submission to the Faculty in time to provide for all necessary examinations before commencement.

A fee of $20 is charged, which covers examinations and diploma; of this amount $10 is payable at the time of registration and $10 at the time of the final examinations.

Honors.

All Commencement prizes are limited to A. B., B. S., or Ph. B. students who have entered at or before the beginning of the Senior year, and who are in full standing at the close of the second term; and to Engineering students entered likewise and in full standing at the close of the second term, in both the Engineering course and the English department of the B. S. or Ph. B. course.

Commencement Appointments.

These honors are assigned to ten Seniors on the basis of scholarship, as stated under Standing, page 89. Provisional appointments are made at the close of the second term Senior, and become final if those who receive them retain the same relative rank to the end of their course. Under present regulations no other persons can become competitors for the Blatchford Oratorical Medals.

Seniors not in full standing at the close of the second term shall be considered ineligible to a Commencement appointment.

Places gained as the result of the third term's work shall be on the excused list, unless ordered otherwise by special vote of the Faculty.

The Valedictory.

This honor is awarded to the Senior of highest standing among the ten receiving Commencement appointments.

Special Honors.

Special Honors are also given at graduation in each of the following subjects: Greek, Latin, English, French, German, Mathematics, Physics, Chemistry, Biology, Economics, History, Sociology and Philosophy. The work required in each case will be the equivalent of three terms of class-room work of two hours per week each, and will be outside of the prescribed or elective courses. The candidate for Special Honors must apply to the head of the department in which he proposes to take Honors not later than the

first Monday of the Spring term of the Junior year. He must attain in all the studies of the department in which he tries for Honors a rank of not less than ninety per cent. of the maximum. The evidence that he has successfully completed the extra course prescribed for him must be submitted not later than June 1st of the Senior year to the Faculty, who shall decide in each case whether the work done is worthy of an Honor. The Honors attained are stated in the diploma, and the names of the students who take Honors are printed on the Commencement programme.

DEGREES CONFERRED

AT THE

ONE HUNDRED AND SIXTH ANNUAL COMMENCEMENT

June 11, 1902.

HONORARY.

LL. D.

David J. Hill.....Washington, D. C.
Lewis Boss.....Albany, N. Y.
George F. Seward, '60.....New York, N. Y.

D. D.

William Adams Brown.....New York, N. Y.
Edward W. Miller, '87.....Auburn, N. Y.

A. M.

Danforth E. Ainsworth.....Albany, N. Y.

IN COURSE.

A. M.

Malcolm Graeme Thomas.....Class of '98
William F. H. Breeze..... " " '99
Olin C. Hotchkiss..... " " '99

Class of 1901.

A. B.

William Hooper Adams.....Charleston, S. C.
Everett J. Best.....Elk Creek.
Walter Allen Cowell.....Albany.
Harry Laurens Crain.....Marathon.
Raymond R. Crim.....Middleville.
William Hugh Gillespie.....New Brighton.
Dickinson Earnest Griffith.....Watertown.

EVERETT T. GROUT.....Cooperstown.
NEILSON C. HANNAY.....Rynex Corners.
DONALD CARLTON HAWKES.....Elmira.
WALTER ENNIS HAYS.....Albany.
FRASER METZGER.....Freehold.
FRANK WATKIN NEARY.....Cohoes.
FRANK TAYLOR OSTRANDER.....Albany.
JOSEPH MILTON RUSSUM.....Schenectady.
ARTHUR LONSON SOUTH.....Birchton.
GILBERT SYLVESTER WOOLWORTH.....Watertown.

Ph. B.

LESTER W. BLOCH.....Albany.
JAMES E. FINEGAN.....Beekmantown.
HERBERT L. FULLER.....Waterport.
JOHN DENNETTE GUTHRIE.....Smithville, Va.
ADDISON HOTALING HINMAN.....Albany.
HOWARD EMMETT SANDS.....Binghamton.
FRANK LAURENCE STILES.....Lansingburg.
ROBERT CHAUNCEY YATES.....Schenectady.

B. S.

HERBERT C. BOTHWELL.....Albany.
DANIEL VEDDER CLUTE.....Schenectady.
HOWARD MARSHFIELD PARSONS.....Batavia.
ARTHUR SHELDON RAYMOND.....Lincoln, Neb.
WILLARD STUART YATES.....Lincoln, Neb.

B. E.

H. BURDETT CLEVELAND.....Amsterdam,
THEODORE DEL. COFFIN.....Glens Falls.
ROBERT BRUCE HOADLEY.....Binghamton.
HARRY C. HOYT.....Kalamazoo, Mich.
GEORGE ISRAEL OAKLEY.....East Williston.
DAVID JOSEPH SHAW.....Auburn.
JAMES H. SMALL, JR.....Charleston, S. C.
HARRY REEVES WILSON.....Albany.

AWARDS

Valedictory.

FRANK TAYLOR OSTRANDER.....Albany.

Commencement Orations.

WILLIAM HOOPER ADAMS..... Charleston, S. C.
EVERETT J. BEST.....Elk Creek.
WILLIAM HUGH GILLESPIE..... New Brighton.
FRASER METZGER..... Freehold.
JOSEPH MILTON RUSSUM..... Schenectady.
HOWARD EMMETT SANDS.....Jordan.

Engineering Theses.

H. BURDETT CLEVELAND..... Amsterdam.
GEORGE ISRAEL OAKLEY..... East Williston.
JAMES H. SMALL, JR.....Charleston, S. C.

Special Honors.

In Greek.....WILLIAM HOOPER ADAMS.
In Latin.....WILLIAM HOOPER ADAMS.
In English.....EVERETT J. BEST.
In Biology.....EVERETT J. BEST.

Warner Prize.

For Seniors.

FRANK TAYLOR OSTRANDER.

Blatchford Oratorical Medals.

For Seniors.

1st. FRASER METZGER.
2nd. JOSEPH MILTON RUSSUM.

Ingham Prize.

For Seniors.

NEILSON C. HANNAY.

Allen Essay Prizes.

For Seniors.

1st. Neilson C. Hannay.
2nd. Donald C. Hawkes.
3d. Addison Hotaling Hinman.

Clark Prizes.

For Juniors.

1st. Walter E. Kruesi.
2nd. Lewis T. Hunt.

Junior Oratorical Prizes.

1st. Raymond C. Donnan.
2nd. Thomas G. Delbridge.

Sophomore Oratorical Prizes.

1st. J. Lewi Donhauser.
2nd. Elbert V. Mullenneaux.

Allison-Foote Prizes.

Won by the Adelphic Society
and
Henry Arthur Pearce,
Class of 1902.

John K. Porter Memorial Scholarships.

Dickinson Earnest Griffith.
Addison Hotaling Hinman.
Frank Laurence Stiles.

Gilbert M. Speir Memorial Scholarship.

Howard Emmett Sands.

Prize for Extemporaneous Speaking.

Samuel B. Howe, Jr.

Daggett Prize.

H. Burdett Cleveland.

Holleran Prize.

To the Senior Engineer of Highest Standing,

David Joseph Shaw.

Phi Beta Kappa.

From the Senior Class.

William Hooper Adams.
Everett J. Best.
Frank Taylor Ostrander.
Joseph Milton Russum.

Sigma Xi.

From the Senior Class.

Everett J. Best.
H. Burdett Cleveland.
Howard Emmett Sands.
David Joseph Shaw.

SCHOOL OF ENGINEERING

UNION COLLEGE

SCHENECTADY, N. Y.

FACULTY

ANDREW V. V. RAYMOND, D. D., LL. D.,
President.

WILLIAM WELLS, PH. D., LL. D.,
Professor Emeritus of Modern Languages and Literature.

OLIN H. LANDRETH, A. M., C. E.,
Professor of Civil Engineering.

JAMES R. TRUAX, A. M., PH. D.,
Professor of the English Language and Literature.

THOMAS WALLACE WRIGHT, A. M., PH. D.,
Professor of Mathematics.

BENJAMIN H. RIPTON, PH. D., LL. D., DEAN,
Professor of History and Sociology.

JAMES H. STOLLER, A. M., PH. D.,
Professor of Biology and Geology.

EDWARD EVERETT HALE, JR., PH. D.,
Professor of Rhetoric and Logic.

CHARLES PROTEUS STEINMETZ, A. M.,
Professor of Electrical Engineering.

FREDERICK H. WILKENS, PH. D.,
Adjunct Professor of Modern Languages.

HOWARD OPDYKE, A. B.,*
Assistant Professor of Physics.

* Absent on leave.

FRANK BLAIR WILLIAMS, C. E., M. S., PH. D.,
Assistant Professor of Civil Engineering.

FREDERICK EDWARDS, C. E.,
Assistant Professor of Civil Engineering.

RICHARD S. CURTISS, PH. D.,
Assistant Professor of Chemistry.

JOHN L. MARCH, A. M.,
Instructor in Modern Languages.

HERBERT L. TOWNE, M. D.,
Instructor in Physical Culture.

EDWIN B. WHEELER, B. S.,
Instructor in Physics.

R. NEIL WILLIAMS, E. E.,
Instructor in Electrical Engineering.

CLARENCE J. COLEY, M. E.,
Instructor in Electrical Engineering.

SCHOOL OF ENGINEERING

Department of Civil Engineering.

Department of Sanitary Engineering.

Department of Electrical Engineering.

This school was founded in 1845. Its object is to give its students such instruction in the theory and practice of one or more of the divisions of Engineering as shall qualify them for immediate usefulness in subordinate engineering positions, and at the same time fit them to fill satisfactorily the higher positions in the profession, after a moderate amount of experience in the routine of practice. The course of instruction aims to effect this by lectures and the study of text-books, combined constantly with exercises in laboratory work and mechanical drawing, instrumental field practice, office computations and designing practice.

The connection of the Engineering School with the College affords its students peculiar advantages for study in the various departments of the latter, to all of which they are admitted without extra charge. Systematic work in a number of these departments forms an integral part of each of the Engineering courses, as will be seen from the curriculum.

The location of Schenectady is most favorable for an Engineering School. The city is on the Mohawk river and is intersected by several railroads and the Erie Canal. These present many bridges and other works interesting to the Engineering student. There are also extensive Locomotive Works, Electrical Works, Machine Shops and Foundries, all of which afford special advantages for examination and study.

For information regarding requirements for admission, expenses, and terms and vacations, see pages 41 to 47, 92 and 7, 8.

Degrees.—Three courses in Engineering are offered, viz.: A general Civil Engineering course, which is intended to give the basis of an Engineering education, including the fundamental principles of all special branches of the profession, a knowledge of both French and German, and a course in English; a special course in Sanitary Engineering, which differs from the general course in substituting special work in Sanitary Engineering for some of the general Engineering studies; and a course in Electrical Engineering. The Degree of Bachelor of Engineering is given for the successful completion of any one of these courses. These three courses are alike during the early part of each course, but widely different during the later part. This permits a student to defer the selection of his particular course until he has become somewhat familiar with the characteristics of the several courses and with his own preference and capabilities. It is intended that the Diplomas in Engineering shall be a guaranty of more than average ability and industry. Students not graduating receive certificates stating what they have done, both as to quantity and quality. Candidates for graduation must have presented a thesis completed according to the regulations of the School, must also have paid all dues at the College Treasury, must have returned all books taken from the College Library, and must be present at the conferring of degrees, unless expressly excused.

Architectural Students will find a large part of the general course adapted to their requirements; particularly the Drafting, Mensuration, Stereotomy, Strength of Materials and the study of Difficult Foundations, Building Construction, Heating and Ventilation, etc.

ADMISSION

General Conditions for Admission.

[See page 41.]

Requirements for Admission.

Candidates for admission to the Freshman class in any of the Engineering courses are required to pass satisfactory examinations in, or present approved certificates covering the following subjects:

English Literature, Arithmetic, Algebra, Plane and Solid Geometry, Plane Trigonometry, Physics, Modern Geography, History of the United States, Physiology, and an amount of German equivalent to two years' study, as given in detail on pages 42-46.

SUBJECTS OF STUDY

Mathematics.

The studies of this department include the following: Algebra (completed), Spherical Trigonometry, Analytic Geometry, Descriptive Geometry, Differential and Integral Calculus. Optional courses in Higher Mathematics are also offered. See also pages 58, 59.

Mechanics and Physics.

The following are the subjects included in the course:

In Analytical Mechanics.—Statics, Dynamics, Hydrostatics, Hydrodynamics, Pneumatics.

In Physics.—Optics, Acoustics, Heat, Electricity, Magnetism and Galvanism. Physical Laboratory practice is required of all engineering students. See also pages 59, 60.

Astronomy.

The instruction in Astronomy includes Spherical Astronomy, Theory of Astronomical Instruments, and Physical Astronomy. The students are also given a practical course in Astronomical Surveying and Location. In the Electrical Engineering course the work is confined to Descriptive Astronomy.

Biology.

Physiology is a required study in each of the three Engineering Courses. Structural Botany is required in the General and Sanitary Course, and Bacteriology is required in the Sanitary Course. Structural Botany includes the microscopical study of the vegetable cell, the tissues and the tissue-systems of the higher plants, with special reference to the uses of woods in the constructive arts. In Bacteriology some of the common bacteria of water, air and soil are studied according to the methods of modern bacteriological research. The accompanying lectures treat of bacteria in regard to their place and role in nature, their relations to sanitary science, etc. In this work the student uses the microscope, prepares sections, etc. See also pages 62, 63.

Geology.

The required work comprises a course in Economic Geology, which includes the explanation of the general principles of geology, and a description of the occurrence and distribution of the mineral deposits and materials for construction in the United States.

Chemistry.

General Chemistry is taught by recitations, lectures and laboratory work during Freshman and Sophomore years and laboratory work in qualitative analysis is continued through the first term of the Junior year.

Sanitary Engineering students, in addition to the above, take Chemical Laboratory work during the first and second terms of the Senior year.

Modern Languages.

All Engineering students are required to take one year of Elementary French and one year of Advanced German.

Electrical Engineering students also have one term of Scientific French and Scientific German during the Senior year.

See pages 50, 51 for a description of these courses.

English Literature and Rhetoric.

The instruction in English is eminently practical and has special reference to the clear and forcible presentation of a subject by a student. The full course in English Literature is laid down on pages 51 to 53. The full course in Rhetoric is to be found on pages 53, 54. The course required of Engineering students is somewhat abridged so as to embrace those portions deemed most important for their special needs.

In the Senior year one of the required essays of each term will be upon a technical subject, prepared under the direction of the Professor of Civil Engineering, the object being to give the Engineering student practice in the preparation of reports upon Engineering subjects.

ENGINEERING

General Course.

The subjects of this course are so arranged as to harmonize with the seasons of the year suitable to field or other work. The course includes the following subjects:

Drawing and Descriptive Geometry.—The instruction in this department extends throughout the entire course. In the first term Freshman the student is instructed in freehand drawing from the flat and from the object, and in freehand lettering. In the second term he is instructed in the use of drawing instruments and the construction of geometrical problems and lettering. In the third term Freshman and first term Sophomore he obtains practice in plotting the surveys made in the field. Further instruction in Topographical Drawing is given in the first term Sophomore. Descriptive Geometry is begun in the second term Sophomore, and in addition to thorough instruction in the theory an effort is made to illustrate by problems some of the most common applications in practice. Schroeder's and the Olivier models and the models of intersections of the Paris Polytechnic School are freely used. The collection of models is described on pages 131, 132. In the third term instruction is given in Shades, Shadows and Perspective and the various projections. In the Junior year the work in drawing includes model and machine drawing and the solution of problems in Graphical Analysis. In the Senior year is given a thorough course in the designing of Engineering structures, including detail drawings of constructions of wood and iron; this is followed by a course of Stereotomy, with drawings from the Stereotomy models of the Paris Polytechnic School. Practice in blue printing is made an important part of these courses.

Surveying.—The third term Freshman includes instruction and practice in the elementary operations in the field with chain and tape, compass, level and rod and transit. Whenever possible the class is exercised in actual work in laying out lots, surveying

lands and computing areas, establishing grades for streets and roads and determining differences in elevation. In the first term Sophomore the subject of Topographical Surveying is taken up and instruction and practice are given in the various methods and instruments. Railroad Surveying is treated in the third term Junior and the students are given exercise in the principal field operations on railroad surveys, office and field location and staking out for construction. The subject of railroad construction and equipment is not treated until the first term of the Senior year.

Geodesy and Astronomical Surveying in the third term of the Senior year comprise a discussion of the figure of the earth; triangulation system; base lines; observations; reductions and adjustment, determination of time, latitude and azimuth; transformation of co-ordinates, map projection.

As a preliminary to instruction in each branch of surveying, a thorough study of the instruments employed is taken up, treating their geometrical, optical and mechanical relations; their adjustments, use and the determination of their instrumental constants, errors and limits of precision.

Office computations, plotting and mapping are made adjuncts of field surveys.

Field practice forms an important part of all of the courses in surveying, the classes being divided into sections, and directed by the instructors.

When feasible, about three weeks of uninterrupted field and office practice will be given in the Junior or Senior year.

Applied Mechanics and Materials.—Applied Mechanics is commenced in the first term of the Junior year, and comprises the extension of Analytic Mechanics and the study of Graphical Analysis, and their applications to engineering problems, operations and constructions, particularly the treatment of stresses, strains, deflections and deformations in elastic materials and structures due to extraneous forces. Closely allied to this are the studies of Hydraulics and Masonry, the former comprising the study of flow through orifices, weirs, pipes and channels, and the development of water power; the latter comprising the mechanics of foundations, piers, abutments, arches, retaining walls, dams, etc.

In conjunction with the above subjects is given the study of the

production, preparation, strength and physical properties of the various engineering materials, including timber, stones, mortar, cement, cast iron, wrought iron and structural steel. Practice in Engineering Laboratory is an important adjunct to this study. This entire division, properly correlated, becomes the foundation of all rational engineering design and construction.

Engineering Design.—The courses in Applied Mechanics and materials prepare the student to undertake the study of Engineering Design proper, which is done throughout the Senior year, as an important feature of the work in bridges, railroads, waterworks, architectural engineering, etc. The exercises in this line of work are, as far as possible, assigned from professional practice, and the student is expected to carry out, from assigned data and conditions, the preliminary study, determinations of stresses, types, dimensions and details, and to turn in the results in the form of working drawings, diagrams and memoirs. There is a large collection of drawings of representative engineering structures in the department from which students can obtain correct ideas of modern practice in the designing of details and the methods of the various large companies engaged in this branch of construction.

Water.—The subject of water supply is considered in all its aspects. In the first term Junior is given a laboratory course in Chemistry, followed by a course in water analysis, accompanied by work in analysis of soil and air. In the third term Junior is given an elementary course in Hydraulics, followed in the Senior year by a fuller development of the principles as applied to the supply of water to cities and villages. This is accompanied by a study of the sanitary aspects of the subject of water supply and preservation of the same from contamination. Some study is also made of pumping engines.

Highways.—The study of highways in the first term of the Junior year comprises a consideration of the highway as an element in the transportation and social system of the State, the principles of its advantageous location and proper construction; a study of the various modes of construction and the materials em-

ployed, its proper maintenance; systems of highway administration.

Streets and Pavements.—A study of the methods of laying out and grading streets and pavements, and of the various paving methods and materials and their treatment, with special reference to their economic and sanitary aspects, is given during the second term of the Junior year.

Motors and Motive Power.—Following the work in Thermodynamics and Hydraulics of the third term of the Junior year, an outline course in motors and motive power is given in the first and second terms, Senior year, comprising a study of the sources of demand and supply of power, steam boilers, steam engines, gas engines, water wheels, electric motors, etc.

Engineering Law and Procedure.—Three hours per week during the last term Senior year are assigned to the study of the principles and procedure of contracts, agency, corporations, commercial and financial transactions, law relating to land boundaries and titles, water courses, surveys, mining claims, etc. During the first and second terms of the Freshman year and the third term of the Senior year, a series of lectures is given on topics pertaining to the training and the qualifications of engineers and to engineering practice.

Sanitary Engineering Course.

The course in Sanitary Engineering differs from the general Engineering course by omitting the Astronomical Surveying, Geodesy and Railroad Construction, and substituting therefor Heating and Ventilation, House Drainage and Plumbing, Sewerage and Sewage Disposal, Sanitary Biology, Sanitary Codes and Laws, and an increase in the amount of Chemistry and Chemical Laboratory work.

Sanitary Condition of Houses.—In the first term Senior will be given courses in Heating and Ventilation and in House Draining and Plumbing. The latter course will have special attention

given to it, and methods of water supply and of the removal of house wastes of buildings in all locations, from the isolated country house to that in a thoroughly drained city, will be considered.

Sewerage and Drainage.—The study of systems of sewerage and drainage and sewage disposal will extend through the last term Senior. The comparative advantages of various systems will be shown and the details of construction and maintenance will receive careful attention.

A course of lectures in the third term Senior will present the basis for the preparation of sanitary codes and the principles upon which laws touching the subject of the public health are based.

Electrical Engineering Course.

A course of Electrical Engineering was first offered and students admitted to the lower classes in the Fall of 1895. The course has now been reorganized and a Department of Electrical Engineering established, with greatly increased facilities in the electrical laboratory.

The course of studies offered by the Department of Electrical Engineering aims at a thorough and broad scientific education of the prospective engineer rather than the specific training of a specialist. The instruction therefore consists of three classes of studies. The general culture studies furnish such training as is now considered essential for every educated man, as languages, literature, history, etc. Such instruction extends over a large part of the first two years and is then followed by a broad and general technical education, giving the student the fundamental principles and their application to all branches of engineering. Ultimately follows the specific instruction in Electrical Engineering, which, while it enables the student after graduation to enter the field of Electrical Engineering practice in the manufacturing or operating company or consulting engineer's office in a subordinate capacity only, has given him all the necessary requirements to gather in a few years' practice the knowledge needed for independent work of greater magnitude.

The instruction especially aims at a thorough understanding of

the fundamental principles rather than a memorizing of numerous facts—that is, aims at quality and not quantity—and as far as possible in all engineering instruction the subject is brought before the students in three different ways: by a theoretical lecture course with recitations, practical instruction in the electrical laboratory paralleling the lecture course, and, following after this, the application of the knowledge gained in lecture courses and laboratory to calculation and design in the drafting room. Throughout the technical course, by work in the laboratory, some familiarity with the apparatus is given to the students before the technical side is taken up in the lecture course, so that when approaching the theoretical studies of electrical phenomena or apparatus the student is already able to appreciate the practical value and importance of the subject with which the theoretical investigations deal.

Through the active interest which the General Electric Company takes in technical education an arrangement has been effected between the college authorities and the officials of the company by which students in the Junior and Senior classes are admitted to the company's works at regular scheduled times under the direction of their instructor, with the privilege and opportunity of studying and inspecting the plant and operations and of being regularly instructed therein. The work has been systematically arranged, and is given simultaneously with the corresponding class and laboratory work, to which it forms an important and valuable adjunct.

The active interest taken by the prominent engineers of the General Electric Company has made it possible to offer to the Junior and Senior classes a systematic lecture course on the different branches of Electrical Engineering, in which the lecture on each topic will be delivered by the specialist who is the highest authority in this branch of Electrical Engineering.

In this course lectures will be given alternately by prominent specialists and by the University instructors, and opportunities offered thereby to the students to gain knowledge in the most recent advance of Electrical Engineering which cannot be secured anywhere else in the world.

The following plan of study is being introduced:

I. GENERAL CULTURE STUDIES.

FRENCH:

3 terms, 3 hours, Freshman year.
1 term, 1 hour, technical French, Senior year.

GERMAN:

3 terms, 3 hours, Freshman year.
1 term, 1 hour, technical German, Senior year.

LOGIC AND COMPOSITION: Essays and Orations:

3 terms, 2 hours, Freshman year.
3 terms, 1 hour, Sophomore, Junior and Senior year.

ENGLISH LITERATURE:

2 terms, 3 hours, Sophomore year.

GENERAL HISTORY:

1 term, 2 hours, Sophomore year.

AMERICAN HISTORY:

1 term, 2 hours, Sophomore year.

HYGIENE, including "First Aid to the Injured":

1 term, 2 hours, Sophomore year.

BIOLOGY:

1 term, 3 hours, Sophomore year.

MINERALOGY AND GEOLOGY, with Special Reference to Engineering Application:

1 term, 3 hours, Sophomore year.

DESCRIPTIVE ASTRONOMY:

1 term, 2 hours, Sophomore year:

ECONOMICS:

1 term, 3 hours, Senior year.

GYMNASTICS, HYGIENE, PHYSIOLOGY OF EXERCISE:

3 terms, 1 hour, Freshman and Sophomore year.

II. GENERAL TECHNICAL STUDIES.

MATHEMATICS:

Algebra, 5 hours first term Freshman year.
Analytic Geometry, 4 hours second and third terms Freshman year.
Plane Trigonometry, 1 hour third term Sophomore year.
Calculus, 4 hours, 3 terms, Sophomore year; 1 hour, 3 terms, Junior year.
Synthetic Geometry, 3 terms, 2 hours, Junior year.
Natural Perspective, 1 hour, Junior year.

PHYSICS:

Experimental Physics, 2 terms, 1 two-hour lecture, Freshman year.
Physical Laboratory, 2 terms, 1 afternoon, Sophomore year.

CHEMISTRY:

Experimental Chemistry, 2 terms, 1 two-hour lecture, Freshman year.
Chemical Laboratory, 2 terms, 1 afternoon, Sophomore year.

FREEHAND AND MECHANICAL DRAFTING:

2 terms, 2 afternoons, Freshman year.

MENSURATION:

1 term, 2 hours, Freshman year.

CIVIL ENGINEERING:

Surveying Practice, 1 term, 3 afternoons, Freshman year.
Elements of Civil Engineering, 1 term, 2 hours, Junior year.

MECHANICS:

2 terms, 3 hours, Sophomore year.
2 terms, 3 hours, Junior year.

HYDRAULICS:

Theory of Hydraulic Machinery, Waterwheels, Turbines, etc., 1 term, 2 hours, Junior year.
Turbine Design and Drawing, 2d term, 1 afternoon, Junior year.

STEAM ENGINEERING:

Theory of the Steam Engine, 2d term, 3 hours, Junior year.
Engine Design and Drawing, 3d term, 1 afternoon, Junior year.
Valve Gear and Control, 2d term, 2 hours, Junior year.
Flywheel and Regulation, 3d term, 1 hour, Junior year.
Steam Locomotive and Traction, 3d term, 2 hours, Junior year.

THERMODYNAMICS AND GAS ENGINES:

1st term, 3 hours, Senior year.

ENGINEERING LAW AND PROCEDURE:

1 term, 2 hours, Senior year.

III. ELECTRICAL ENGINEERING STUDIES.

SOPHOMORE YEAR:

Electrical Laboratory, 1 afternoon, 2 terms.

JUNIOR YEAR:

Direct Current Circuits, Apparatus and Machines, 1st and 2d terms, 2 hours.
Calculation and Design, 2d and 3d terms, 1 afternoon.
Laboratory, 1st term, 2 afternoons; 2d term, 1 afternoon.
Alternating Current Circuits and Phenomena, 2d term, 2 hours.
Generators and Synchronous Motors, 3d term, 2 hours.
Transformers, 3d term, 2 hours.
Laboratory, 2d term, 1 afternoon; 3d term, 1 afternoon.
Illumination and Illuminants, 2 terms, 2 hours.
Telegraph and Telephone, 1 term, 2 hours.
Meters and Instruments, 1 term, 2 hours.
National Electric Code of Wiring and Fire Underwriters' Rules. Laboratory, 3d term, 1 afternoon.

SENIOR YEAR:

Electric Railway and Traction, 2d term, 2 hours.
Railway Design and Calculation, 2d term, 1 afternoon.
Induction Machines, 1st term, 2 hours.
Converters, 1st term, 2 hours.
Transmission and Distribution, 2 terms, 3 hours.
Alternating Current Design and Calculation, 1st term, 1 afternoon.
Electrical Laboratory, 2 afternoons.
Modern Theory of Electrical Engineering, 3 terms, 2 hours.
Oscillating Currents and High Frequency Phenomena, 2 terms, 1 hour.
Electro-Chemistry, 1 term, 2 hours.
Lecture Course by Specialists, 1 term, 2 hours.

GRADUATE COURSE—ONE YEAR.

To those students who after graduating from the four-year Electrical Engineering course desire to increase their knowledge, a Graduate Course is offered in which, besides instruction in higher branches of Electrical Engineering, there will be occasion to carry out original investigations under the supervision and with the assistance of specialists prominent in Electrical Engineering practice on subjects closely connected with the most recent advance of Electrical Engineering. In return for the assistance offered to the Graduate students in their research work by prominent specialists the Graduate students will be required to devote a small part of their time to assisting the regular University instructors in laboratory instruction. This course leads to the degree of Electrical Engineer, and is open to graduates of Union College or of other institutions approved by the Faculty.

Some of the courses offered to the graduate students are:

Long Distance Transmission, 2 terms, 2 hours.

Design and Control of Electric Power Systems of Very Great Magnitude, 2 terms, 2 hours.

Electric Railway and Traction, continued, 3 terms, 2 hours.

Modern Theory of Electrical Engineering, continued, 3 terms, 2 hours.

Oscillating Currents and High Frequency Phenomena, 2 terms, 1 hour.

Lightning and Lightning Protection, 1 term, 2 hours.

Wave Transmission, with Special Application to Telephony, 1 term, 2 hours.

Scientific Foundations of Electrical Engineering, 2 terms, 2 hours.

Chemistry of Very High Temperature, 1 term, 2 hours.

Laboratory.

Research Work.

SPECIAL GRADUATE COURSES.

Graduates of Union College, or of other institutions approved by the Faculty, or students approved by the Department of Electrical Engineering and by the Faculty as having knowledge fully equivalent to that of graduate students, will be admitted to some of the studies of the Graduate Course as Special Graduate Students.

It is the intention of the College to offer Special Graduate Courses of one year for those who, after graduation from Electrical Engineering courses, desire to acquire additional knowledge in other branches.

Voluntary Studies.

Any of the studies of the Classical or of the Scientific course of the College may be taken by Engineering students without extra charge.

Final Examinations.

During the Senior year a series of Final Examinations will be held covering the more important subjects of the entire course. The list of subjects in which examinations are to be given during any term will be determined by the Faculty.

Thesis.

Each candidate for graduation is required to present on or before the first Wednesday in June of his graduation year a satisfactory thesis on a subject that has been approved by the Professors of Civil or Electrical Engineering. This thesis must be original in its character, and may be either a design for some engineering structure, plant, process or operation, or an independent investigation of some principle, problem or matter of engineering importance. Reviews of existing structures, plants or processes, unless of special educational value and containing original investigation, will not be approved as subjects. This thesis is to be in a form prescribed at the time of approval of the subject, and is to be bound for deposit in the library of the Engineering School,

and must be presented in this shape on or before the stipulated date. The subjects, with outlines of the proposed treatment, must be submitted for approval not later than January 1st of each year, and the work on the thesis must be presented for the inspection and criticism of the Professor in charge of the Department at intervals during its progress.

Instruments and Apparatus.

The School is supplied with field instruments of the best description, comprising a large Theodolite, suitable for refined geodetic operations, Transits, Surveyors' Compasses, Prismatic Compasses, Burneir's Compass, Solar Compass, Y Levels, the Levels of Troughton, Egault, Lenoir and Burneir; Plane Table, Sextant, Octant, Mountain Barometers, Aneroid Barometer and a Marine Chronometer.

The extensive private collection of models and instruments belonging to the late Professor Gillespie has been purchased for the Engineering School.

The collection of models in Descriptive Geometry and Stereotomy is very complete. The following are some of the most important:

The Olivier Collection.—This consists of about fifty models, representing the most important and complicated ruled surfaces of Descriptive Geometry, particularly warped or twisted surfaces. Their directrices are represented by brass bars, straight or curved, to which are attached silk threads representing the elements or successive positions of the generatrices of the surfaces. Each of these threads has a weight suspended by it, so as always to make it a straight line. These weights are contained in boxes sustaining the directrices and their standards. The bars are movable in various directions, carrying with them the threads, still stretched straight by the weights in every position they may take; so that the forms and natures of the surface which they constitute are continually changing, while they always remain ruled surfaces. In this way a plane is transformed into a paraboloid, a cylinder into a hyperboloid, etc.

These models were invented by the late Theodore Olivier while Professor of Descriptive Geometry at the Conservatoire des Arts et Métiers, in Paris. One set of them is now deposited there, and a second is in the Conservatory of Madrid. Copies of some of them are to be found in most of the polytechnic schools of Germany. The Union College set is the original collection of the inventor, having been made in part by his own hands, and, after his death, in 1853, retained by his widow till bought of her by Professor Gillespie, in 1855. It is more complete than that in the Paris Conservatoire. It may be worth noticing that the silvered plates on the boxes, reading *"Inventé par Théodore Olivier,"* etc., were added by Madame Olivier, at her own expense, after the purchase, as a tribute to the memory of her husband, her own words being, *"Je tenais à ce que chaque instrument portât le nom du savant dont la réputation passera à la postérité."*

Professor Bardin's (Paris) plaster models (seventy) of the INTERSECTIONS of prisms, pyramids, cylinders, cones, etc.

Schroeder's (Darmstadt) models (twenty) of elementary DESCRIPTIVE GEOMETRY. The planes of projection are in wood, and the lines and surfaces in metal; models illustrating Shades and Shadows.

Stone Cutting Models (twenty) in plaster, selected from those of L'Ecole Polytechnique of Paris.

Professor Bardin's models (ten) in plaster, of OBLIQUE ARCHES.

Groined and cloistered arch models (ten) in wood and plaster.

Models of structures in stone, consisting of bridges, culverts, etc.

Winding-stair models in wood and plaster. Full sized models of voussoirs and skew-backs of an oblique arch.

Models in Topography.—French and German plaster models, giving all the different forms of ground, accompanied by topographical drawings, showing how to represent these forms by contour lines, hatchings and shades from vertical and oblique light; models and maps in colored topography; a large model

of Mount Cenis Pass, showing the wagon road and contour lines.

Architectural Models.—Models of the five orders of Architecture from L'Ecole des Beaux Arts, Paris; portals; stairs; roofs; walls; buttresses; domes, etc.

Engineering Models.—Schroeder's models of joints, brick bonds, etc.; spur wheels; bevel wheels; cranes; pile drivers; various forms of water-wheels; pumps; cylinders; valves; eccentrics, etc.; steam engines.

Casts of St. Venant's models showing the changes of form in bodies subjected to flexure. Full sized model of the liquid vein measured by Poncelet and Lesbros.

Models of bridges of various systems, comprising truss, suspension, tubular and arch bridges; Doyne's Dynamometer Bridge Models showing, by means of dynamometer, strains at different points; models of roof trusses, arranged for using the dynamometer to show the different stresses.

Models of fortifications, illustrating Vauban's system; shot, shell, etc.

Models of culverts, piers, abutments, culvert heads, wing walls, rail sections, etc.

Electrical Laboratory Equipment.

The equipment of the Electrical Engineering laboratory has been greatly augmented of late by a large amount of apparatus, a considerable portion being appropriated by the General Electric Company, and the laboratory has been extended to accommodate this apparatus.

The purpose of a college laboratory of Electrical Engineering is two-fold: To familiarize the student with the shape, appearance, relative proportions and construction of modern electrical apparatus, and to instruct him in the handling, assembling, testing and operation of electrical apparatus under normal and abnormal conditions.

Because of the great variety and large size of modern electrical apparatus, the former purpose can be fulfilled very incompletely only, even in the largest and best equipped college laboratories.

Through the favorable disposition of the General Electric Company by giving the Electrical Engineering students of Union College free access to the works and testing rooms, this purpose is admirably fulfilled here, and by frequent and regular inspection trips to the Works and Testing Department of the General Electric Company under the direction of the college instructors, which trips constitute an integral part of the laboratory instruction, the students gain a very intimate knowledge of modern electrical apparatus of all types and sizes, not only when assembled and in operation and test, but also are enabled to observe their construction in the shops.

In equipping the college laboratory special consideration was therefore given to the selection only of such representative types of apparatus as can be handled, operated and tested by the students, and of a size sufficiently large to correspond to modern practice, but not so large as to make the operation under abnormal conditions—that is, under conditions which as a rule are specially instructive—unsafe for the apparatus. Entirely excluded from the laboratory equipment was all such machinery as the students could not be permitted to handle freely.

Three sources of power are provided: A direct connected unit, consisting of a Westinghouse gas engine and a Westinghouse direct current generator; connection with the 500-volt trolley circuit of the Schenectady Railway Company, and connection with the primary distributing mains of the 2,300-volt alternating current city circuit. In the latter case the voltage is reduced by banks of step-down transformers, so that the students can handle the safe low tension circuits only.

A very large number of various sizes of transformers are provided to give the students practical experience in connecting transformers for different ratios and for transformation between three-phase, quarter-phase, six-phase, etc., systems. The equipment further contains three-phase, quarter-phase and six-phase alternators and synchronous motors, the two characteristic types of induction motors, three and six-phase rotary converters, and numerous smaller induction motors, converters and direct current motors and generators of different types. A constant current arc machine, with different types of arc lamps and a constant alternating current transformer, with series arc lamps, a storage

battery, testing tables, switchboards and numerous instruments of the indicating and the integrating type are also provided for efficient instruction.

Power is distributed from a central switchboard to the various smaller machines in the Department, to the mechanical workshop provided for the students, and to the general lighting circuit of the building, and further extensions of the laboratory are under contemplation.

Physical Apparatus.

(See page 59.)

Collections in the Department of Chemistry.

In Mineralogy.—The Wheatley collection contains nearly 4,000 specimens of minerals, the result of the labors of Charles M. Wheatley. All of these have been labeled according to the nomenclature and order adopted by Dana. They are, without exception, open at all times to the students. They furnish an admirable means of practical illustration in Mineralogy. Among the rare and valuable specimens are those of Anglesite, Cerusite, Mimetite and Calcuprite, which in American specimens are equaled only by those in the British Museum. There are many fine specimens representing the noble metals from all parts of the world. There are few known species of minerals of which the collection does not contain some specimens.

In addition to this there is a large series of unlabeled specimens for crystallographic and blow-pipe examination.

In Metallurgy.—The College possesses a suite of ores of the useful metals, comprising over 1,000 specimens. These have been arranged to illustrate their mode of occurrence and geographical distribution. In addition are the fluxes, fuels, etc., used in obtaining the metals from the ores, together with the slags and metals themselves in various forms. There is a large number of models and drawings of stacks, furnaces, etc.; also suites of specimens of wood, charcoal, mineral coal, peat, etc., for physical inspection; also specimens of most of the useful alloys.

In Industrial Chemistry.—A large number of specimens of the materials used in the manufacture of the mineral and of some of the organic acids; the crude products themselves and the materials used in the manufacture of the alkalis, soaps, matches, black lead, candles, petroleum products; linseed, olive, castor, cottonseed and other oils; paper, porcelain, glass, fire and building brick, mortar and cements, beet and cane sugars, white lead and other paints, etc., etc.

Maps, Drawings, Etc.

This collection embraces a large number of maps, plates, profiles, topographical drawings and spherical projections; about fifty thousand engravings, lithographs, photographs and detail drawings of engineering and architectural structures; working drawings of machines, bridges, buildings, etc.

Library.

The students have the use of the College and Society Libraries. The former contains the Engineering and Scientific Library of the late Professor Gillespie. See page 66.

Physiology and Physical Education.

(See page 64.)

For catalogue or special information regarding the Department of Civil and Sanitary Engineering address

OLIN H. LANDRETH, Schenectady, N. Y.

For catalogue and special information regarding the Department of Electrical Engineering address

CHARLES P. STEINMETZ, Schenectady, N. Y.

COURSES OF STUDY

Leading to the Degree of B. E.

GENERAL ENGINEERING COURSE.

FRESHMAN YEAR.

[Alike for the General and Sanitary Engineering Courses.]

First Term.

Hours per week.

3 French.
3 German.
3 Freehand Drawing.
5 Algebra.
2 Physiology.
1 Gymnastics.
Lectures.

Second Term.

3 French.
3 German.
3 Analytic Geometry.
2 Mensuration.
3 Mechanical Drawing.
2 Rhetoric.
1 Experimental Physics.
1 Experimental Chemistry.
1 Gymnastics.
Lectures.

Third Term.

3 French.
3 German.
3 Rhetoric.
3 Analytic Geometry.
4 Surveying and Plotting.
1 Experimental Physics.
1 Experimental Chemistry.
Summer Vacation Work.

GENERAL ENGINEERING COURSE.

SOPHOMORE YEAR.

[Alike for the General and Sanitary Engineering Courses.]

First Term.

Hours per week.

5 Calculus.
5 Topographical Surveying.
3 Chemistry.
3 English Literature.
1 Hygiene.

Second Term.

3 Calculus.
5 Mechanics.
2 English Literature.
3 Chemistry.
3 Descriptive Geometry.
1 Electrical Laboratory.
One Essay and one Oration.

Third Term.

5 Physics and Physical Laboratory.
3 Calculus.
3 Descriptive Geometry; Shades and Shadows.
3 Chemistry.
2 City Surveying.
2 Mechanics.*
One Essay and one Oration.
Summer Vacation Work.

* Given in 1903 in place of City Surveying.

GENERAL ENGINEERING COURSE.

JUNIOR YEAR.

[Alike for the General and Sanitary Engineering Courses.]

First Term.

Hours per week.

5 Physics and Physical Laboratory.
4 Applied Mechanics.
3 Chemical Laboratory.
2 American History.
3 Highways.
Rhetorical Exercises.

Second Term.

5 Mechanics of Materials and Engineering Laboratory.
2 American History.
3 Kinematics and Machine Drawing.
2 Pavements.
1 Natural Perspective.
3 Astronomy.
Rhetorical Exercises.

Third Term.

4 Stresses in Structures and Graphical Analysis.
3 Hydraulics.
2 Thermodynamics.
3 Route Surveying.
3 Mathematical Theory of Electricity.
2 American History.
Rhetorical Exercises.
Inspection Trips.
Summer Vacation Work.

GENERAL ENGINEERING COURSE.

SENIOR YEAR.

First Term.

Hours per week.

2 Motors and Motive Power.
4 Engineering Stresses.
3 Economics.
2 Stereotomy.
2 Outlines of Architecture.
2 Railroad Construction.
2 Economic Geology.
One Literary Essay.
One Technical Essay.
Inspection Trips.

Second Term.

3 Motors and Motive Power.
4 Engineering Design and Construction.
3 Water Supply Engineering.
2 Building Construction.
2 Method of Least Squares.
3 Sewerage.
One Technical Essay.
One Literary Essay.
Inspection Trips.

Third Term.

5 Engineering Design and Construction.
3 Engineering Law and Procedure.
4 Geodesy and Field Astronomy.
4 Electives.
Thesis.

SANITARY ENGINEERING COURSE

[The Freshman, Sophomore and Junior Years of this course are identical with those years of the General Engineering Course.]

SENIOR YEAR.

First Term.

Hours per week.

2 Motors and Motive Power.
4 Engineering Stresses.
3 Economics.
3 Heating and Ventilation.
3 Chemical Laboratory.
2 Economic Geology.
One Literary Essay.
One Technical Essay.
Inspection Trips.

Second Term.

3 Motors and Motive Power.
4 Engineering Design and Construction.
3 Water Supply Engineering.
2 Chemical Laboratory.
3 Sewerage.
2 Structural Botany.
One Literary Essay.
One Technical Essay.
Inspection Trips.

Third Term.

5 Engineering Design and Construction.
2 Sewage Disposal.
3 Engineering Law and Procedure.
3 Bacteriology.
1 Sanitary Codes and Laws.
1 House Drainage and Plumbing.
2 Electives.
Thesis.

ELECTRICAL ENGINEERING COURSE.

For the general plan of the course see page 124.

In 1902-3 the course was as follows:

FRESHMAN YEAR

As in General Course, page 137.

SOPHOMORE YEAR

As in General Course, page 138.

JUNIOR YEAR.

First Term.

Hours per week.

5 Physics and Physical Laboratory.
4 Applied Mechanics.
3 Chemical Laboratory.
2 American History.
3 Highways.
Rhetorical Exercises.

Second Term.

1 Mathematics.
3 Mechanics and Graphostatics.
4 Direct Current Apparatus.
1 " " Laboratory.
2 Hydraulic Machinery.
2 Steam Engine.
1 Valve Gear, Steam Engine.
1 Natural Perspective.
2 American History.
Rhetorical Exercises.

Third Term.

1 Mathematics.
2 Elements of Civil Engineering.
2 Turbine Design.
2 Steam Engine Design.
1 Direct Current Design.
4 Alternating Current Circuits and Apparatus.
2 " " Laboratory.
2 American History.
Rhetorical Exercises.
Inspection Trips.
Summer Vacation Work.

ELECTRICAL ENGINEERING COURSE

SENIOR YEAR.

First Term.

Hours per week.

2 Motors and Motive Power.
4 Engineering Stresses.
3 Economics.
4 Mathematical Theory of Electricity.
4 Theory of Direct Current Machinery.
One Literary Essay.
One Technical Essay.
Inspection Trips.

Second Term.

3 Motors and Motive Power.
2 Electrical Transmission of Energy.
2 Alternating Currents.
2 Modern Theory of Electrical Engineering.
4 Dynamo Designing.
4 Electrical Laboratory.
One Literary Essay.
One Technical Essay.
Inspection Trips.

Third Term.

3 Alternating Currents.
3 Alternating Current Machine Designing.
2 Electrical Transmission of Energy.
2 Electric Railways and Lighting.
3 Engineering Law and Procedure.
2 Modern Theory of Electrical Engineering.
1 Thesis.

SPECIAL GRADUATE COURSE FOR THE YEAR 1902-3.

2 hrs. Modern Theory of Electrical Engineering.
2 hrs. Scientific Foundations of Electrical Engineering.
1 hr. Technical German.
Laboratory.
Research Work.

ALBANY MEDICAL COLLEGE

MEDICAL DEPARTMENT OF

UNION UNIVERSITY

SEVENTY-SECOND SESSION

ALBANY MEDICAL COLLEGE

The Medical College building, situated on Eagle street, Albany, is well appointed in its lecture rooms, laboratories, dissecting room and museums. The chemical laboratory is fitted with every requisite for the illustration of the lectures and the use of students, while the new Bender Hygienic Laboratory furnishes unexcelled facilities for instruction in histology, pathology, bacteriology and clinical microscopy.

The location of the college is such as to afford superior advantages to the student. The hospitals and dispensaries furnish an abundant supply of material for the illustration of clinical medicine and surgery, while the museums are especially rich in anatomical and pathological preparations.

With the session of 1897-'98 a four-year course was inaugurated, and four courses are now required by law in this state. The curriculum embraces lectures by professors and lecturers; recitations conducted mainly by instructors, and practical demonstrations, clinical teaching and laboratory work, in which the professors in the different departments are assisted by clinical assistants and demonstrators.

The Albany Hospital, St. Peter's Hospital, Child's Hospital, Albany's Hospital for Incurables, County Hospital, South End Dispensary, Eye and Ear Infirmary, and dispensaries connected with each are, by the regulations of their governing boards, made available for clinical purposes to the students.

Appointments to positions on the house staffs of the Albany Hospital, and other hospitals in Albany and neighboring places, are annually made and are competed for by the members of the graduating class.

TRUSTEES

WILLIAM L. LEARNED,
President.

SIMON W. ROSENDALE,
Vice-President.

JOHN H. JACKSON,
Treasurer.

CHARLES F. VAN BENTHUYSEN,
Secretary.

ERASTUS D. PALMER,
CLARENCE RATHBONE,
JOHN M. CRAPO,
JAMES D. WASSON,
OSGOOD H. SHEPARD,
CHARLES L. PRUYN,
HENRY T. MARTIN,
AMASA J. PARKER,
J. TOWNSEND LANSING,
ANDREW V. V. RAYMOND,
JESSE W. POTTS,
EDWARD A. DURANT,
CLIFFORD D. GREGORY,
CHARLES TRACEY,
WILLIAM J. WALKER,
ALDEN CHESTER,
EDWARD BOWDITCH,
GEORGE P. HILTON.

MAYOR OF ALBANY,
RECORDER OF ALBANY,
Ex-officio.

CATALOGUES are sent with care, and graduates of the college changing their post-office address, or not receiving them, will please notify

WILLIS G. TUCKER, M. D., *Registrar,*
Albany Medical College,
Albany, N. Y.

FACULTY

ANDREW VAN VRANKEN RAYMOND, D. D., LL. D.,
Chancellor of the University.

ALBERT VANDER VEER, M. D., PH. D., DEAN,
Professor of Surgery.

JOHN MILTON BIGELOW, M. D., PH. D.,
Emeritus Professor of Materia Medica, Therapeutics and Diseases of the Throat and Nose.

SAMUEL BALDWIN WARD, M. D., PH. D.,
Professor of Theory and Practice of Medicine and of Hygiene.

JAMES PETER BOYD, M. D.,
Professor of Obstetrics, Gynecology and Diseases of Children.

WILLIS GAYLORD TUCKER, M. D., PH. D., REGISTRAR,
Professor of Chemistry and Toxicology.

WILLIAM HAILES, M. D.,
Anthony Professor of Pathological Anatomy, Histology and Fractures and Dislocations.

CYRUS STRONG MERRILL, M. D.,
Professor of Ophthalmology and Otology.

FREDERIC COLTON CURTIS, M. D.,
Professor of Dermatology.

HENRY HUN, M. D.,
Professor of Diseases of the Nervous System.

SAMUEL ROSEBURGH MORROW, M. D.,
Professor of Practice of Surgery and of Orthopedic Surgery.

HERMON CAMP GORDINIER, M. D.,
Professor of Physiology.

HOWARD VAN RENSSELAER, M. D.,
Professor of Materia Medica and Therapeutics, and Adjunct Professor of Theory and Practice of Medicine.

JOSEPH DAVIS CRAIG, M. D.,
Professor of Anatomy. Curator of the Museum.

WILLIS GOSS MACDONALD, M. D.,
Professor of Abdominal and Clinical Surgery.

GEORGE BLUMER, M. D.,
Professor of Pathology and Bacteriology.

Adjunct Professor.

ANDREW MacFARLANE, M. D.,
Medical Jurisprudence and Physical Diagnosis.

Clinical Professors.

HERMAN BENDELL, M. D.,
Otology.

Ophthalmology.

CLINTON BRADFORD HERRICK, M. D.,
Railway Surgery.

ARTHUR GUERNSEY ROOT, M. D.,
Diseases of the Throat and Nose.

LEO HAENDEL NEUMAN, M. D.,
Theory and Practice of Medicine and Gastro-Enteric Diseases.

JESSE MONTGOMERY MOSHER, M. D.,
Insanity, Neurology and Electro-Therapeutics.

Lecturers.

WILLIAM OLIN STILLMAN, M. D.,
History of Medicine.

HARRY JUDSON LIPES, M. D.,
Obstetrics.

CHARLES HARPER RICHARDSON, M. D.,
Minor Surgery.

ARTHUR WELLS ELTING, M. D.,
Surgical Pathology.

GEORGE EMORY LOCHNER, M. D.,
Gynecology.

ARTHUR TURNER LAIRD, M. D.,
Clinical Microscopy.

THEODORE JAMES BRADLEY, PH. G.,
Inorganic Chemistry.

SPENCER LYMAN DAWES, M. D.,
Materia Medica, and Instructor in Theory and Practice of Medicine.

Instructors.

CHARLES HENRY MOORE, M. D.,
Ophthalmology and Otology.

THOMAS WILLIAMS JENKINS, M. D.,
Anatomy and Pathological Anatomy.

WILFRED SILVESTER HALE, M. D.,
Anatomy and Demonstrator of Anatomy.

CLEMENT FRANK THEISEN, M. D.,
Throat and Nose.

Arthur Sautter, M. D.,
Dermatology and Genito-Urinary Diseases.

Henry Larned Keith Shaw, M. D.,
Diseases of Children.

Alvah Harry Traver, M. D.,
Surgery and Assistant Demonstrator of Anatomy.

Edgar Roscoe Stillman, M. D.,
Physiology.

Edgar Albert Vander Veer, M. D.,
Surgery.

Eugene Eunson Hinman, M. D.,
Anatomy and Assistant Demonstrator of Anatomy.

Edward Waterbury Becker, M. D.,
Physiology.

Christian Gottlieb Hacker, M. D.,
Materia Medica and Therapeutics.

Harry Wardell Carey, M. D.,
Histology.

Harris Moak, M. D.,
Pathology.

Clinical Assistants.

William Henry George, M. D.,
Michael Daniel Stevenson, M. D.,
Washington Irving Goewey, M. D.,
Elijah Hudson Rider, M. D.,
Thomas Addis Ryan, M. D.,
James Manning Moore, M. D.,
James Francis Rooney, M. D.,
William Pitney Brierley, M. D.

Students, 1902-03.

Fourth Year.

Samuel Halcom Behrend Basch.....Rondout
Frederick Ernest Bolt.....Masonville
Donald Boyd, A. B.....Fonda
J. Howard Branan.....Albany
John Edward Canfield.....Johnstown
Henry Milligan Chandler.....South Orange, N. J.
Sylvester Cornell Clemans.....Gloversville
Herbert Thomas Crough.....Canajoharie
Archie Irving Cullen.....Watervliet
Russell Clute.....Amsterdam
William Sebastian De La Hoyde.....Brooklyn
Archibald John Douglas.....Southampton, Mass.
Louis Le Bell Dulberger.....New York City
Edwin Maurice Griffith.....Steuben
Conrad Rowland Hoffman.....Selkirk
Reuben Burdette Hoyt.....Deposit
Frank Keator.....Accord
Frederick John MacDonald.....Watervliet
Charles Richard Marsh.....Oneonta
Frank Clay Maxon, Jr.....Chatham
Miles Ambrose McGrane.....Watervliet
John Crapo Merchant, A. B.....Nassau
Addison Robert Miller.....Rensselaer
William Leo Mulcahy.....Albany
Thomas Stephen Augustine O'Connor.....Lansingburg
Mark M. O'Meara.....Plattsburg
Virgil Dural Selleck.....Glens Falls
Millard Francis Shafer.....Cobleskill
Edwin Forrest Sibley.....Bennington, Vt.
Frank Templeton Smith.....Troy
George Henry Humphrey Smith.....Little Falls
James Newell Vander Veer, A. B.....Albany
Isaac Ernest Van Hoesen.....Medway
Philip Wolfman.....New York City

Third Year.

James Marmaduke Boddy, A. M.....Troy
Palmer Romaine Bowdish.....Cornwall-on-Hudson
George Lay Branch.....East Springfield
Charles William Chapin.....Unadilla Center
Guy Forsythe Cleghorn.....Green Island
Chester Thompson Cobb.....Southampton, Mass.
Thomas Folwell Cole.....Romulus
John Isaac Cotter.....Poughkeepsie
Marcus Albert Curry.....Voorheesville
Arthur Thomas Davis.....Utica
Bransen Keemper DeVoe.....Accord
Malcolm Douglas, A. B.....Albany
Thomas Joseph Dowd.....Cohoes
Silas Lorenzo Filkins.....Albany
Leland Delos Fosbury, A. B.....Sidney
Joseph Nicholas Bennett Garlick.....Albany
William Entwistle Garlick.....Fall River, Mass.
Everal C. Haviland.....Wolcott
Harold Eliphalet Hoyt, A. B.....Cambridge
George John Jennings.....Ballston
William George Keens.....Albany
Arthur Charles Kline.....Port Leyden
George Spencer Lape.....Mechanicville
Harry Lovejoy Loop.....Cohoes
Dennis Alphonsus Murphy.....Gloversville
Robert Joseph O'Brien, Jr., B. S.....Watervliet
Daniel Vincent O'Leary, Jr.....Albany
Joseph Day Olin, A. B.....Watertown
John Hendry Reid.....Troy
Burt Luverne Shaw, Ph. G.....Lansingburg
Benjamin J. Singleton.....Glens Falls
Edward Augustine Stapleton.....Hoosick Falls
Arthur Wesley Thomas.....Middle Granville
Chester Erastus Hidley Tracy.....Troy
Richard Henry Van Denburg.....Medway
Frank Barton Wheeler.....Troy
Frank Edward White.....Union
George David Wilde.....Cranesville

GUY VAIL WILSON.....Masonville
TREVOR CRANDALL YATES.....New Lisbon

Second Year.

KENNETH DANIEL BLACKFAN.....Cambridge
HOMER ANDREW BUSHNELL.....North Adams, Mass.
ARCHIE BERT CHAPPELLE.....Kingston
ARTHUR PRESTON CLARK.....Albany
KENN ROMEO COFFIN.....Cooperstown
MILES JACOB CORNTHWAITE.....Lansingburg
JOHN HENRY FAMIAN COUGHLIN.....Troy
WALTER ALLEN COWELL.....Albany
JOHN DIXON CRANE.....Hawley, Pa.
CHARLES AUGUSTINE CROISSANT.....Albany
ORREL CHARLES CURTIS.....South Egremont, Mass.
*RICHARD EDWARD DELANEY.....Friar's Head, Nova Scotia
THEODORE DAVID DOCKSTADER.....Sharon Centre
PATRICK JOHN DONAHOE.....Albany
WILLIAM MULVIHILL DWYER.....Amsterdam
JOHN PETER FABER.....Stuyvesant Falls
FRED EDWARD FLANAGAN.....St. Regis Falls
THOMAS JOSEPH FLYNN.....Johnstown
PERLIA ELIJAH GARLOCK.....Sprakers
WILLIAM JOSEPH GARVEY.....Troy
CHARLES WILLIAM LEWIS HACKER.....Albany
CHARLES ELBERT HAYNES.....Masonville
WALTER ENNIS HAYS.....Albany
CHESTER ALAN HEMSTREET.....Waterford
THURMAN ALSON HULL.....Berlin
LEMUEL RANKINS HURLBUT.....Troy
FRANK JAMES HURLEY.....Bennington, Vt.
MATTHEW JOSEPH KEOUGH.....Cohoes
OSCAR FRANKLIN LARSON.....Middle Granville
JAMES EDWARD MALONEY.....West Albany
FRANCES JOSEPH NOONAN.....Troy
GEORGE WASHINGTON PAPEN, JR.....Albany
HERBERT BOWEN REECE.....Troy

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* Partial course.

WILLIAM GARFIELD ROMMEL.....Troy
HENRY STANTON ROWE, JR., A. B.....Cohoes
HARRY RULISON.....Albany
FRANK GEORGE SCHAIBLE.....Albany
JOHN RALPH SCHERMERHORN.....Randall
FREDERICK FOSTER SCHIRCK.....Saratoga Springs
ARTHUR HAMILTON SCHUYLER.....Fonda
FRANCIS JOSEPH SCOTT.....Cohoes
HAMILTON MANN SOUTHWORTH.....New Lebanon
CHARLES WILLIAM STRATTON.....Lee, Mass.
CHARLES CLARK SWEET.....Petersburg
JAMES HARVEY VAN BUREN.....Jefferson
EDWARD HILLIS VINES.....Saratoga Springs
GEORGE WALRATH.....St. Johnsville
ALFRED LEROY WARNER.....Troy
ROSCOE CONKLING WATERBURY.....Nassau
JAMES WATSON WHITE.....Wappingers Falls
EDWIN BARNES WILSON, A. B.....Hudson

First Year.

HENRY FRANCIS ALBRECHT.....Troy
FRED NICHOLAS BIBBY.....Pottersville
*WILLIAM ARTHUR BING.....Castleton
JOHN BREEN.....Wevertown
ROY MUNRO COLLIE.....Johnstown
MOREY CHARLES COLLIER.....Savona
CHARLES ELISHA COLLINS, PH. G.....Troy
FREDERIC CHARLES CONWAY.....Albany
ADELBERT STEPHEN DEDERICK.....Cohoes
THEOBALD FREDERICK DOESCHER.....Albany
LEE ROY DUNBAR.....Gloversville
WILLIS WOODFORD DUTCHER.....Albany
VERNON R. EHLE.....Gloversville
HERMAN ERNEST GAK.....Fairmount
GEORGE REINHOLD GOERING.....Utica
STOWELL BURROUGHS GRANT.....Afton
PERCIVAL WILLIAM HARRIG.....Albany
JOSEPH FRIEND HARRIS.....Albany

* Matriculant only.

CLINTON BENJAMIN HAWN.....Albany
JAMES EDWARD HOURIGAN.....Schenectady
*EDWARD WILLIAM JACKSON.....Little Falls
SAMUEL ORESTES KEMP.....Albany
WINFIELD SNELL KILTS.....Fort Plain
WILLIAM ANDREW KRIEGER.....Poughkeepsie
PRICE LEWIS.....Holland Patent
JOHN SEARS MCCORMACK.....Albany
FLOYD DEMPSTER MICHAEL.....Lassellsville
DAVID CUSHING NOLAN.....Albany
ZENAS VAN DUZEN ORTON.....Northampton
IRVING DEYO PELL.....Hudson
CHARLES ALBERT PRESCOTT.....North Creek
*STEPHEN JOHN HENRY REED.....Schenectady
WALTER ANCEL REYNOLDS.....Coeymans
WILLIS NELSON SIMONS.....Canajoharie
REUBEN WARREN VAN DYKE.....Westport
LEMON DWIGHT WASHBURN.....Fort Ann
WILLIAM ABNER WOODRUFF.....Troy
WILLIS EVAN WORTHING.....Fairport
EDWARD GOVE WHIPPLE.....Malone
HERBERT JOHN WRIGHT.....Rhinebeck

* Matriculant only.

CALENDAR, 1903-1904.

1903.

Regular winter session begins,	Tuesday, September 29.
Thanksgiving vacation begins,	Wednesday, November 25
Lectures resumed, ...	Monday, November 30.
Christmas vacation begins,	Thursday, December 24.

1904.

Lectures resumed, ...	Monday, January 4
Commencement, ...	Tuesday, May 10.

PRELIMINARY EXAMINATION.—The preliminary examination of medical students is under the control of the Board of Regents of the University of the State of New York. Those contemplating the study of medicine should apply to the High School Department, University State of New York, Albany, by letter or otherwise, if information concerning this examination further than that given in the catalogue of the Medical College is desired. One of the examinations will be held in Albany, September 29-October 2, 1903.

MID-WINTER WRITTEN EXAMINATIONS in all the departments are held before the Christmas vacation. A printed schedule of these examinations is furnished the class.

Course of Instruction.

The four years' graded course required of all candidates for the degree of doctor of medicine embraces the following subjects:

First Year.

1. **Anatomy**—three lectures; six hours osteology and dissection. 2. **Inorganic Chemistry**—three lectures; four hours laboratory; one recitation. 3. **Physiology**—two lectures; one recitation; two

demonstrations. 4. **Histology**—five hours laboratory. 5. **Materia medica**—three lectures; two recitations. 6. **History of Medicine**—one lecture half the term.

Lectures 11½; laboratory 9 hours; dissection and demonstrations 8 hours; recitations 4.

Second Year.

1. **Anatomy**—three lectures; eight hours dissection and demonstration; two recitations. 2. **Organic Chemistry and Toxicology**—three lectures; one recitation. 3. **Hygiene**—one lecture. 4. **Physiology**—two lectures; one recitation. 5. **Therapeutics**—one lecture; one recitation. 6. **Theory and Practice**—one lecture; one recitation. 7. **Surgery (minor)**—one lecture; one demonstration. 8. **Bacteriology and Pathology**—one lecture; seven and a half hours laboratory. 9. **Clinics**—two hours surgical.

Lectures 13; dissections and demonstrations 8 hours; laboratory and demonstrations 8½ hours; recitations 6; clinics 2.

Third Year.

1. **Theory and Practice**—three lectures; two recitations. 2. **Clinical microscopy**—two and a half hours laboratory. 3. **Therapeutics**—two lectures. 4. **Electro-therapeutics**—one lecture half the term. 5. **Obstetrics**—two recitations. 6. **Pediatrics**—one lecture; one recitation. 7. **Neurology**—one lecture; one recitation; one clinic. 8. **Surgery (pathology, operative, fractures, dislocations)**—six lectures; two and a half hours demonstrations; one recitation. 9. **Physical Diagnosis and Ophthalmology**—section work, two hours. 10. **Railroad surgery**—one lecture half the term. 11. **Clinics**—two hours medical, three surgical.

Lectures 14; laboratory 2½ hours; demonstrations 2½ hours; recitations 7; section work 2; clinics 6.

Fourth Year.

1. **Theory and Practice**—three lectures; one recitation. 2. **Neurology**—one lecture; one clinic. 3. **Gynecology**—one lecture. 4. **Obstetrics**—one lecture; one recitation. 5. **Surgery (including orthopedics)**—three lectures; one recitation.

6. **Medical jurisprudence**—one lecture, half the term. 7. **Specialties**—one recitation. 8. **Conferences**—one medical; one surgical. 9. **Otology**—one lecture, half the term. 10. **Clinics**—two hours medical, three surgical. 11. **Section work**—thirteen hours.

Lectures 10; recitations 4; conferences 2; clinics 6; section work 13 hours.

The order of instruction for the ensuing session will be found in the catalogue of the Medical College, and may be obtained by application to the Registrar.

Laboratories.

Practical Chemistry.—The chemical laboratory is well furnished and conveniently arranged, each student having a desk and reagents for his own use, and being supplied with all necessary apparatus. The laboratory course is preceded, since although some knowledge of chemistry is highly desirable none is now *required* at entrance, by a series of lessons upon chemical nomenclature, notation and the essential principles of theoretical chemistry, including the laws of combination and valence, and these subjects are therefore more briefly treated in the regular lecture course. The practical laboratory work includes tests for those metals and acids, which, in combination, are important as constituents of medicinal compounds or as poisons, together with the separation of the chief groups and the examination of unknown substances. The more important toxicological and urinary tests are performed and all chemical reactions are written upon the blackboard, discussed by the class, and entered upon their notes.

Histology, Pathology, Bacteriology and Clinical Microscopy.

Work in these departments is carried on in the Bender Hygienic Laboratory, on Lake Avenue, near the Albany Hospital.

This building was erected by Mr. Matthew W. Bender, of Albany, and is thoroughly equipped with the apparatus necessary for the study of histology, pathology, bacteriology and clinical microscopy. Practical work in these branches is obligatory upon all students, and abundant opportunity is furnished in the laboratory for acquiring a thorough knowledge of these important subjects.

In histology the work consists of explanatory talks on the subject of the day's study, followed by microscopic study of sections, each student being required to make drawings of his sections. The different tissues and organs of the body are taken up systematically.

In bacteriology the work consists of lectures followed by practical laboratory exercises. It is intended to render the student familiar with the underlying principles of bacteriology and their application to clinical medicine and surgery.

In pathology the work consists of a short lecture on the subject for the day, followed by practical exercises in mounting, staining and examining sections. Students make drawings of their sections. They are instructed in the technique of making autopsies, and material from autopsies and surgical operations is demonstrated to them as available.

In clinical microscopy the course consists of practical work in the examination of blood, urine, sputum, fæces, etc.

A limited number of students who have shown proper aptitude will be allowed to work along more advanced lines during the summer months.

For the Alumni of this school, and for physicians in the vicinity, this laboratory offers excellent facilities for the examination of urine, sputum, pathological specimens and blood. Information regarding such examinations may be obtained by communicating with Dr. George Blumer, Director.

Practical Clinical Courses.

In order to familiarize students with the practical work of their profession, and to bring them into closer personal contact with patients, the fourth year class is divided into sections of eight or ten men, and on four days in each week each man devotes several hours to the examination and personal observation, under the supervision of the instructors, of patients in the wards and outpatient departments of the various hospitals and dispensaries. In this clinical work especial attention is devoted to the complete examination of the blood, urine, sputum and stomach contents, as well as to the special examination of the eye, ear and other organs. Thus in the course of the school year the men in each

section acquire practical knowledge and technical diagnostic dexterity in general medicine, general surgery, dermatology, neurology, insanity, otology, laryngology, ophthalmology, rhinology, diseases of children and infants, infant feeding, diseases of the rectum and genito-urinary tract, operative surgery, orthopedic surgery, operative obstetrics, electro-therapeutics and medical technique.

Fees and Expenses.

Fees, excepting the final examination fee, are payable in advance, are not returnable, and are as follows:

First Year.

Matriculation	$ 5 00
Lecture Course	100 00
Chemical Laboratory	10 00
Histological Laboratory	10 00
Dissection (including material)	5 00
	$130 00

Second Year.

Matriculation	$ 5 00
Dissection	10 00
Lecture Course	100 00
Bacteriological and Pathological Laboratory	15 00
	$130 00

Third Year.

Matriculation	$ 5 00
Lecture Course	100 00
Clinical Microscopy Laboratory	5 00
	$110 00

FOURTH YEAR.

Matriculation	$ 5 00
Lecture Course	100 00
Final Examination	25 00
	$130 00

The payment of three hundred dollars in advance entitles to attendance upon four courses of lectures, exclusive of laboratory and other special fees above stated, and effects a saving of one hundred dollars on the cost of the four year course. The final examination fee must be paid before the examinations begin. Graduates of the school may attend lectures and stated clinics without charge.

The cost of living in Albany is less than in most other cities of its size. The janitor of the college keeps a list of boarding houses at which good rooms and board can be obtained at from four to five dollars a week or upwards, and by clubbing together students can live comfortably at still lower rates.

Requirements for Graduation.

The candidate must be twenty-one years of age, and exhibit a certificate from a physician or surgeon, duly authorized by law to practice his profession, that he has studied medicine and surgery under his instruction during the period required by law in this state, and he must present evidence of having complied with the law concerning preliminary examination.

He must have attended not less than four regular courses of lectures, of which the last shall have been at this college. Students who have attended one or more courses of lectures at other recognized medical colleges, who may desire to be admitted to advanced standing in this college, will be credited with the work they may have done and with examinations they may have passed, other than those of the senior year, if satisfactory evidence of such attendance and of the passing of such examinations is presented.

He must be of good moral character.

He must maintain a satisfactory standing during his course and pass a satisfactory final examination in the several branches taught.

Regular and punctual attendance is required, and matriculation tickets are endorsed with attendance at the end of the term.

For catalogues or further information, address

WILLIS G. TUCKER, M. D., *Registrar,*

Albany, N. Y.

January 1, 1903.

ALBANY LAW SCHOOL

LAW DEPARTMENT

UNION UNIVERSITY

FIFTY-THIRD YEAR

1903-1904

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ALBANY LAW SCHOOL

This School is among the oldest institutions of the kind in the country, having been established in 1851, and its graduates number many of the most successful men in the profession. The School is and has been largely represented in the Executive, Judicial and Legislative departments of this and many other States, as well as of the federal government.

It became a part of Union University in 1873, and begins its fifty-third year as a law school with the coming scholastic year. During its long and successful career it has, in common with other law schools, done much to demonstrate what was at one time doubtful, but is now accepted almost as an axiom, that a course at the law school is a well-nigh necessary prerequisite to a successful professional career. Its instructors have always been men of repute and standing, both for professional learning and personal character.

Local Advantages.

The local advantages of the city of Albany, as the seat of a professional school, cannot be overrated. It is the capital of one of the leading States in the Union, whose Legislature is in session here for the third part of every year, affording opportunities for observing the machinery of legislation, and of listening to learned discussions of important governmental and social questions. It is easily accessible, remarkably healthful, and the scene of great business and professional activity. It is large enough to afford its inhabitants all the means of culture and recreation naturally to be looked for in a city, while it is not so large as to make the cost of living burdensome, even to persons of extremely limited means.

Facilities for Study.

The facilities afforded the students for reading and study are unsurpassed.

Besides the convenient and well chosen library of the school accessible to the students at all hours of the day and evening,

the students have the privilege of using the State Law Library, the most extensive and best selected in the United States, consisting of 65,000 volumes or more.

With free access to these libraries the student may be relieved to a great extent from purchasing text-books.

Academic Year.

The academic course, leading to the degree of LL. B., is two years, divided into two semesters, each. Students may enter at the beginning of any semester. The scholastic year for 1903-1904 begins September 23.

Requirements for Admission to the Senior Class.

Any student not a college graduate who has completed two years of required legal study, after conforming with the requirements of the Regents as to general education, or any college graduate who has completed one year of such study after graduation, and any student presenting a certificate that he has satisfactorily completed one year of study at a law school of recognized standard, will be admitted to the Senior class without examination upon production of the Regents' and Clerk's certificates, and will be graduated in the same manner as students have heretofore been graduated in the one year course, and will receive a certificate for the time spent at the school; but the degree of LL. B. will be conferred only upon students who have completed the entire course of two years at one or more law schools.

Requirements for Admission to the Junior Class.

Any student who has conformed to the requirements of the Regents as to general education, or satisfies the Faculty that he will so conform to such requirements within the year allowed by the Regents for that purpose, after commencing the study of law, may enter the Junior class, and upon completion of the two years' course and passing the required examination will be graduated with the degree of LL. B.

Methods of Instruction.

Instruction is given by lectures involving a free use of simple text-books in connection with leading cases. Instruction is also afforded by the study and discussion of selected cases, which are memorized. Moot courts are frequently held by a professor assigned for that work.

Examinations.

Written examinations will be held at the close of each semester, and no student will be allowed to continue his studies who does not maintain a proper standard both in deportment and work. This rule will be rigidly enforced, so that a certificate of attendance upon the Albany Law School for any given period will be evidence that the time has been honestly and studiously devoted to the study of the law.

Requirements for Graduation.

Candidates for graduation in one year course must have attended during a full course of two semesters; must have passed in all examinations, and conformed to all requirements.

Candidates for the degree of LL. B. must have attended two full years, passed in all examinations and conformed to all requirements.

Tuition.

The fees for tuition are payable in advance as follows: For the full course of one year tuition, $100; matriculation fee, $10; diploma fee, $3, or $60 for the first semester and $53 for the second. For the full course of two years and degree of LL. B., tuition $100 each year; matriculation fee, $10; degree, $5, or $60 for the first semester and $50 for each semester thereafter except the last, which will be $55.

For members of the bar of this or other states, a deduction from the above rates of $25 per year will be given.

Special students will be admitted at special rates.

No deviation will be made from the requirement that tuition shall be paid in advance, unless by special arrangement before the student enters the school, based on satisfactory reasons.

No fees will be returned on account of non-attendance for any cause, but when a whole term is necessarily lost the student may attend the corresponding term of the next year without additional charge.

Board, Etc.

The price of board in Albany varies, according to the accommodations offered, or required, from $4 to $7, including room, fuel and light. *Students intending to enter the school are particularly requested to inform the secretary, W. R. Davidson, in advance, if possible.* A list of boarding houses is kept by the secretary for the information of students, and upon application to him at the office in the building they will be assisted in securing satisfactory accommodations.

For catalogue or other information address

THE ALBANY LAW SCHOOL,

Albany, N. Y.

W. R. Davidson, *Secretary.*

STUDENTS.

Senior Class—1902-3.

ADAMS, HARRY G.....Ballston Spa
AIKEY, GEORGE L.....Springfield, Mass.
AUSTIN, H. LEROY.....Catskill
BADGER, JR., JOHN P.....Malone
BETTS, LEE FRAZEE.....Catskill
BOORN, LELAND L., PH. B., *Union*.....Schenevus
BRANCH, CHARLES C.....Port Jervis
BRENNAN, JAMES J.....Hudson
BRITTON, NORMAN N.....Rochester
BURNSIDE, RUSSELL B.....Maryland
CASELLAS, J. RAMOS.....Manati, Porto Rico
CHANEY, CEYLON G.....Hermon
CHASE, LEVIE R.....Theresa
COOK, JR., W. BURT, A. B., *Cornell*.....Cohoes
CRARY, LEON G.....Canton
CUMMINGS, JOHN L., *Manhattan*.....Middleton
DENISON, ALFRED DUDLEY.....Johnstown
DEVITT, ALBERT F.....Morrisville
DE YONG, ALBERT R.....Alexander Bay
DRUMMOND, RICHARD C. S., A. B., *Hamilton*.....Auburn
DUNN, CHARLES A., A. B., *Cornell*.....Whitesboro
DYER, DAVID A.....Albany
FILLEY, FREDERICK C.....Troy
FEINSON, JOSEPH.....Philadelphia, Pa.
FITZPATRICK, JOHN TRACEY.....Albany
FOSTER, JAMES K.....Goshen
FULLER, EDWARD M., M. A., *St. John's*.....New York
GILLIN, MARK C.....Woodstock, N. B.
GORDEN, ISAAC J.....Kingston
GROVES, HARRY F.....Kingston
GUARDINEER, FREDERICK R., *Dartmouth*.....Albany
HANMER, ANDREW J.....Long Lake
HOWARD, HARRY.....Fort Hunter
LAURENT, FRED C.....Little Falls
LAWLESS, JOHN L.....New London, Conn.

LEARY, JAMES A.....Saratoga Springs
MARVIN, DWIGHT W., A. B., *Williams*.....Troy
MCCANN, CHARLES J.....Poughkeepsie
MERRIMAN, PORTER LEE, PH. B., *Union*.....Albany
MERRILL, HARRY R.....Schenectady
MILLS, BORDEN H.....Albany
MINKIN, LEOPOLD, B. S., *Union*.....Albany
MORAN, SAMUEL F.....Honeoye Falls
MORRISON, LINCOLN W.....Thompsonville, Conn.
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WHIPPLE, BURDETTE.....Salamanca
WHITBECK, GEORGE H. B. B.....Richmondville
WILTSE, CLINTON R.....Alexander Bay
WOOD, MABEL J.....Herkimer
WRIGHT, JAMES K.....Baldwinsville

Junior Class—1902-3.

BAHLER, H. C., A. B., *Union*.....Schenectady
BENETT, MARK.....Hammondsport
BIGGAM, MONTGOMERY P.....Albany
BLOCH, LESTER W., PH. B., *Union*.....Albany
BOOTEY, EDWARD R.....Jamestown
BOUTON, EUGENE H.....Prattsville
BROWN, FREDERICK C.....Porter

Byrne, William T.....Albany
Cahill, William J. K., A. B., *Manhattan*.....Albany
Chaffee, Stephen .....Liberty
Cooke, Jason C.....Troy
Cooper, James .....Catskill
Conway, Lewis J.....Troy
Cramer, R. Dinglison.....Waterford
Curtis, Harry McK.....Coxsackie
DeVoe, Milton .....Albany
DeVoe, Miram .....Albany
DeVoe, Nicholas .....Albany
Diefendorf, John E.....Albany
Drummond, Nelson N., A. B., *Hamilton*.....Auburn
Dugan, Daniel A.....Fishkill
Easton, Edward, Jr., A. B., *Yale*.....Albany
Flinn, Maurice B.....Albany
Frisbie, Miles R.....Elmira
Hackett, John M.....Hyde Park
Hanes, Robert B.....Albany
Harris, Robert B.....Albany
Hatt, George J., A. B., *Williams*.....Albany
Healy, William J.....Hoosick Falls
Hinman, Addison Hotaling, Ph. B., *Union*.....Albany
Hunter, Frank D., *Colgate*.....Troy
Jameson, Edward C.....Hopedale, Mass.
La Marche, Arthur E.....Plattsburgh
Leland, Hugh H., M. A., *St. John*.....Chicago, Ill.
Lincoln, Leroy A., A. B., *Yale*.....Albany
Marshall, Charles W.....West Sunnyside
McCarthy, Gordon B.....Watertown
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McFarron, Leonard B.....Whitehall
McGuire, Quiney.....Albany
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McKelvey, L. B., *Colgate*.....Waterford
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SENNETT, JAMES E.....Wells, Vt.
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SMITH, GEORGE H., B. S., *Colgate*.....Hamilton
STILES, FRANK L., PH. B., *Union*.....Troy
SUTTON, JAMES W.....Oswego
TAYLOR, MARSH N., *Rochester University*.....Rochester
THOMPSON, FRANCIS X.....Albany
THOMAS, HERBERT B.....Rochester
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THE DUDLEY OBSERVATORY

The Dudley Observatory is located on Lake Avenue, in the southwestern part of Albany, to which site it was removed in 1893 from its former location in the northern part of Albany. It is devoted to original researches in astronomy, according to the purpose of its founders and successive patrons. Its contributions to science are represented in two volumes of "Annals," and in other published volumes and memoirs contained in the transactions of learned societies and astronomical journals. Its principal line of work at the present time is the determination of problems relating to the positions and motions of the stars and of the solar system as a whole. The staff consists of the director, two assistants, and several computers.

The instrumental equipment of the Observatory is designed for the purposes of exact measurement in line with its chosen work. In the tower of the main building is the Pruyn Equatorial, with object-glass twelve inches in diameter. This instrument is equipped both for visual and photographic use, and is of a high order of mechanical perfection. The Olcott Meridian Circle is located in a separate building, especially designed for securing the utmost equality in the temperature between the external air and that in the building itself. Its object-glass is eight inches in diameter. It was made by Pistor and Martins, of Berlin, and is regarded by astronomers as a masterpiece of accurate workmanship. This instrument has been employed for many years in obtaining the measurements necessary for the construction of the numerous and elaborate star catalogues which have issued from the Dudley Observatory.

In addition to these instruments the observatory is in possession of various small telescopes, clocks, chronographs and smaller apparatus.

The institution is supported by an endowment, chiefly contributed by Mrs. Blandina Dudley and the late Catharine W. Bruce; as well as by appropriations which have been received from the

National Academy of Sciences, and from current contributions of trustees and friends of the institution.

The Dudley Observatory is not designed to give general instruction in Astronomy, though special students contemplating instruction in professional lines have been received from time to time under an arrangement of computing service to the observatory.

The observatory is opened to visitors on Tuesday evening of each week from 8 to 10 o'clock.

For further particulars apply to

LEWIS BOSS,
Director.

ALBANY COLLEGE OF PHARMACY

DEPARTMENT OF PHARMACY OF

UNION UNIVERSITY

ALBANY COLLEGE OF PHARMACY

The Albany College of Pharmacy was created by act of the Board of Governors of Union University, June 11, 1881, and constitutes the *Department of Pharmacy of Union University.* It was incorporated as the "Albany College of Pharmacy," August 27, 1881.

The exercises of the college are held in the Albany Medical College building, on Eagle street, distant but a block from the Capitol, and in the pharmaceutical laboratory on Maiden Lane. The lecture rooms and laboratories are perfectly adapted to the needs of the college and furnish to the faculty the very best facilities for imparting instruction. The lectures are delivered in the chemical lecture room on the first floor, adjoining which is the large and well fitted chemical laboratory, where instruction is given to the classes in practical chemistry. The collections in the different departments are very complete and afford the professors ample facilities for the illustration of the lectures.

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HAROLD SANFORD BARNES.....Canton
ALBERT GEORGE BLICHFELDT.....Saratoga Springs
MARY LOIS BRAYTON.....Hartford
FREDERIC DEAN BROWN.....Schenectady
DAVID EDWARD CONNERY.....Greenwich
ARTHUR JAMES DORAN.....Troy
WESLEY JOHN HAIG.....Madrid
HOWARD HUXLEY HAWKINS.....Brushton
HERBERT FRANKLIN HOGEBOOM.....Nassau
WALTER GREEN LADD.....Hoosick Falls
GEORGE LODERHOSE.....Monticello
JOHN KINNEY MCDONALD.....Schenectady
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JOHN THOMAS MCLAUGHLIN.....Boonville
WILLIAM EVERETT MOATS.....Johnstown
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EVERETT KRAMRATH PANGBURN.....Albany
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FRED NICHOLAS SCHUTT.....Gloversville
GEORGE AARON SCOTT.....Sheffield, Mass.
JOSEPH PHILIP SEGUIN.....Rensselaer
CHARLES EDWIN STICKLES.....Albany
CHARLES ROGERS SWEET.....Millerton
FRANK STARK THYNE.....Johnstown
JAMES WILLIAM WALLACE.....Schenectady
FRED NIVER WHITE.....Albany
JAMES ROGERS WRIGHT.....Glens Falls

Junior Class.

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JAMES FRANCIS COLWELL.....Waterbury, Conn.
WILLIAM MARTIN CONDON.....Troy
CARLTON ROOD CROFF.....Carthage
FRED STANLEY HEIMER.....Hamden
CHARLES FERRIS HOLLEY.....Kingsbury
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WILLIAM MAURICE LANGE.....Albany
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DAVID STEPHEN MCCULLOCH.....Ravena
HENRY WILLIAM MILLETTE.....Champlain
BERNARD BENEDICT MURPHY.....Glens Falls
ELMER WARREN RICE.....Westport
HARRY FREDERICK SMITH.....Troy
FRANK FULLERTON STEVENSON.....Argyle
WILLIAM DAVID THOMAS.....Granville
JOHN EVERETT THOMPSON.....Troy
GEORGE BLACKALL TURNER.....Albany
HOWARD CAMPBELL WEIDMAN.....Albany
HIRAM MOORE WELLS.....Glens Falls

Calendar for 1903-1904

1903.

Introductory lecture, Monday, October 5.

Election vacation, Monday and Tuesday, November 2 and 3.

Thanksgiving vacation begins Wednesday, November 25.

Lectures resumed Monday, November 30.

Christmas vacation begins Thursday, December 24.

1904.

Lectures resumed Monday, January 4.

Commencement, Tuesday, March 30.

Entrance Requirements.

All applicants for admission to regular standing in this college will be required to pass a preliminary examination or present a grammar school certificate entitling the holder to enter a high school, or satisfactory written evidence of an equivalent preliminary education. The examination of those who cannot present such evidence will be held at the opening of the session. A knowledge of Arithmetic, Geography and Grammar, as far as is taught in the grammar schools of this state, and entitling the possessor to enter a high school of the state, will be required.

The Curriculum

of the college embraces—

Chemistry—Theoretical, General, Pharmaceutical and Analytical.

Botany—Structural, Systematic and Analytical.

Materia Medica and Pharmacognosy.

Pharmacy—Theoretical and practical.

Microscopy—Theoretical and practical in its relations to Pharmacy.

Physics and Pharmaceutical Mathematics.

Requirements for Graduation.

The diploma of this college confers the degree of GRADUATE IN PHARMACY, (Ph. G.). Applicants for this degree must be at least twenty-one years of age, of good moral character, have attended two full courses of lectures (which shall have included all laboratory practice) in this college, or the last course in this college and the first in some other college of pharmacy; have had inclusive of the time of attendance at this college four years' practical experience with some reputable and competent pharmacist; have passed a satisfactory examination and paid all fees as hereafter stated. Experience in wholesale stores cannot be taken in lieu of the practical experience in a retail pharmacy.

Fees for Tuition.

FIRST YEAR.

Matriculation	$ 3 00
Lecture tickets	30 00
Chemical laboratory	15 00
Pharmaceutical laboratory	15 00
Recitations	5 00

SECOND YEAR.

Lecture tickets	$30 00
Pharmaceutical laboratory	15 00
Microscopical laboratory	10 00
Recitations	5 00
Graduating fee	10 00

Students who have attended two full courses of lectures at this college may attend further courses without extra charge. Payment of Laboratory and Recitation Fees will, however, be required should the courses be taken.

Situations.

Students desirous of obtaining employment will be assisted so far as possible in securing situations, but employment cannot be promised in advance, and places cannot be secured by correspondence. Desirable situations have been obtained for many applicants, and graduates of the college are in constant demand. During the past year the faculty have had a much larger number of applicants for graduates to fill lucrative positions than they have been able to supply. The demand on the part of the employers for skilled assistants is steadily increasing, and a college disploma or license from an examining board is demanded by law of those who engage in the practice of pharmacy in most of the states and cities of the Union.

For annual catalogue giving more complete information address

THEODORE J. BRADLEY, Ph. G., Secretary,

4 Lancaster Street, Albany, N. Y.

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OF

UNION UNIVERSITY

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ONE HUNDRED AND NINTH YEAR

NEW YORK
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ANNUAL CATALOGUE

OF

UNION UNIVERSITY

1903-1904

NEW YORK
PRESS OF JOHN B. WATKINS
9-15 MURRAY STREET

UNION UNIVERSITY

COLLEGE CALENDAR FOR 1904

	S	M	T	W	T	F	S
Jan.	..	..	..	..	..	1	2
	3	**4**	**5**	**6**	**7**	**8**	9
	10	**11**	**12**	**13**	**14**	**15**	16
	17	**18**	**19**	**20**	**21**	**22**	23
	24	**25**	**26**	**27**	**28**	**29**	30
	31	..	..	..	..	..	..
Feb.	..	**1**	**2**	**3**	**4**	**5**	6
	7	**8**	**9**	**10**	**11**	**12**	13
	14	**15**	**16**	**17**	**18**	**19**	20
	21	22	**23**	**24**	**25**	**26**	27
	28	**29**	..	..	..	..	..
Mar.	..	..	**1**	**2**	**3**	**4**	**5**
	6	**7**	**8**	**9**	**10**	**11**	12
	13	**14**	**15**	**16**	**17**	**18**	19
	20	**21**	**22**	**23**	**24**	**25**	26
	27	**28**	**29**	**30**	**31**	..	..
Apr.	..	..	..	..	..	1	2
	3	4	**5**	**6**	**7**	**8**	9
	10	**11**	**12**	**13**	**14**	**15**	16
	17	**18**	**19**	**20**	**21**	**22**	23
	24	**25**	**26**	**27**	**28**	**29**	30
May	1	**2**	**3**	**4**	**5**	**6**	**7**
	8	**9**	**10**	**11**	**12**	**13**	14
	15	**16**	**17**	**18**	**19**	**20**	21
	22	**23**	**24**	**25**	**26**	**27**	28
	29	30	**31**	..	..	..	..
June	..	..	..	**1**	**2**	**3**	4
	5	**6**	**7**	**8**	9	10	11
	12	13	14	15	16	17	18
	19	20	21	22	23	24	25
	26	27	28	29	30	..	..

	S	M	T	W	T	F	S
July	..	..	..	..	..	1	2
	3	4	5	6	7	8	9
	10	11	12	13	14	15	16
	17	18	19	20	21	22	23
	24	25	26	27	28	29	30
	31	..	..	..	..	..	..
Aug.	..	1	2	3	4	5	6
	7	8	9	10	11	12	13
	14	15	16	17	18	19	20
	21	22	23	24	25	26	27
	28	29	30	31	..	..	..
Sept.	..	..	..	..	1	2	3
	4	5	6	7	8	9	10
	11	**12**	**13**	**14**	**15**	**16**	**17**
	18	**19**	**20**	**21**	**22**	**23**	24
	25	**26**	**27**	**28**	**29**	**30**	..
Oct.	..	..	..	..	..	..	1
	2	**3**	**4**	**5**	**6**	**7**	8
	9	**10**	**11**	**12**	**13**	**14**	15
	16	**17**	**18**	**19**	**20**	**21**	22
	23	**24**	**25**	**26**	**27**	**28**	29
	30	**31**	..	..	..	..	..
Nov.	..	..	**1**	**2**	**3**	**4**	5
	6	**7**	8	**9**	**10**	**11**	12
	13	**14**	**15**	**16**	**17**	**18**	19
	20	**21**	**22**	**23**	24	25	26
	27	**28**	**29**	**30**	..	..	..
Dec.	..	..	..	..	**1**	**2**	**3**
	4	**5**	**6**	**7**	**8**	**9**	10
	11	**12**	**13**	**14**	**15**	**16**	17
	18	**19**	**20**	**21**	**22**	**23**	24
	25	26	27	28	29	30	31

Figures in heavy type indicate days on which Union College is in session.

UNIVERSITY CALENDAR

1904.

4 Jan.	Registration Day for Students, Winter term, Union College.
4 Jan.	Winter term of Medical College resumes.
5 Jan.	Recitations begin, Union College.
28 Jan.	Day of Prayer for Colleges.
30 Jan.	First semester of Law School ends.
3 Feb.	Second semester of Law School begins.
19 Feb.	Allison-Foote Prize Debate between the Literary Societies.
22 Feb.	Washington's Birthday.
5 March	Examination for conditioned students.
25 March	Winter term of Union College ends.
28 March	Registration Day for Students, Spring term, Union College.
29 March	Recitations begin, Union College.
30 March	Commencement of the College of Pharmacy.
1-4 April	Easter Recess, Union College.
15 April	Selection of Junior and Sophomore prize orators.
7 May	Examination for conditioned students.
10 May	Commencement of the Medical College.
14 May	Date for presentation of prize essays.
27 May	Senior Examinations end.
27 May	Commencement of Law School.
30 May	Memorial Day.
5 June	Sunday. Baccalaureate Sermon, Union College.
6 June	Prize Contest in Extemporaneous Speaking, and Prize Oratory of Juniors and Sophomores.
7 June	Meeting of Trustees, Phi Beta Kappa, Sigma Xi, Alumni.
8 June	Commencement of Union College, the second Wednesday in June. President's reception.

University Calendar—Continued

1904.

9, 10 June	Entrance examinations, Union College.
12 Sept.	Registration Day for Freshmen, Union College.
14 Sept.	Registration Day for Students other than Freshmen, Union College. Entrance Examinations, Union College.
15 Sept.	First Chapel Exercises and Recitations, Entrance Examinations concluded.
16 Sept.	Freshman Recitations begin.
17 Sept.	Examination for conditioned students.
20 Sept.	Registration Day, Law School.
21 Sept.	Law School begins.
27 Sept.	Winter term of Medical College begins.
3 Oct.	The College of Pharmacy begins.
8 Nov.	Election Day.
24 Nov.	Thanksgiving Day. Recess four days.
3 Dec.	Examination for conditioned students.
23 Dec.	Fall term of Union College ends.

1905.

2 Jan.	Winter term of Medical College resumes.
2 Jan.	Registration Day for Students, Winter term, Union College.
3 Jan.	Recitations begin, Union College.
4 Jan.	Winter term of College of Pharmacy resumes.
26 Jan.	Day of Prayer for Colleges.
17 Feb.	Allison-Foote Prize Debate between the Literary Societies.
22 Feb.	Washington's Birthday.
4 March	Examination for conditioned students.
24 March	Winter term of Union College ends.
27 March	Registration Day for Students, Spring term, Union College.

University Calendar—Concluded

28 March	Recitations begin, Union College.
28 March	Commencement of the College of Pharmacy.
8 May	Commencement of the Medical College.
11 June	Sunday. Baccalaureate Sermon, Union College.
12 June	Prize Contest in Extemporaneous Speaking and Prize Oratory of Juniors and Sophomores.
13 June	Meeting of Trustees, Phi Beta Kappa, Sigma Xi, Alumni.
14 June	Commencement of Union College, the second Wednesday in June. President's reception.
15, 16 June	Entrance Examinations, Union College.

UNION UNIVERSITY

Union University embraces the following institutions:

Union College

Albany Medical College

Albany Law School

Dudley Observatory.

Albany College of Pharmacy.

Union College acquired by its charter, granted in 1795, full University powers, but the creation of graduate institutions at Schenectady was not found practicable. Schools of Law and Medicine and also an Astronomical Observatory have long existed at Albany, only a few miles distant. The arrangement naturally suggested by these circumstances was, that the Professional Schools and the Observatory at Albany should be united with Union College, under the Charter and Board of Trustees of the latter. This was accordingly effected by the incorporation of Union University in 1873. The Albany College of Pharmacy was created by the Board of Governors, June 21, 1881, and incorporated as a Department of the University, August 21 of the same year.

The President of Union College and permanent Chancellor of Union University has the oversight of the University, each of the institutions having its resident Dean. The Dean of Union College acts in the place of the President in his absence, and also assists him in matters delegated to him by the President. The University Board of Governors is composed of permanent trustees of Union College and of representatives of each of the other institutions embraced in Union University.

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Instructor in Anatomy.

STUDENTS OF UNION COLLEGE

Abbreviations

c, A. B. course; *ls,* Ph. B. course; *s,* B. S. course; *g e,* B. E. course in General Engineering; *s e,* B. E. course in Sanitary Engineering; *e e,* B. E. course in Electrical Engineering; N. S., North Section; M. S., Middle Section; S. S., South Section; N. C., North College; S. C., South College.

Seniors, Class of 1904

c	Walter Edward Beadle	*Cooperstown*	Φ Δ Θ House
c	Claude Norton Brown	*Barnersville*	5 M. S. N. C.
c	Thaddeus Guilford Cowell	*Albany*	Φ Γ Δ House
c	J. Lewi Donhauser	*Albany*	Medical College
ls	Stephen Calkin Fiero	*Katsbaan*	K A Lodge
se	Chauncey French	*Binghamton*	Φ Γ Δ House
ls	William Henry Guardenier	*East Springfield*	ΦΔΘHouse
c	Cornelius Lansing Hays	*Albany*	Φ Δ Θ House
ge	Leland Wesley Irish	*Caldwell*	Δ Φ House
c	James Fuller Lawsing	*Schenectady*	K A Lodge
ls	Andrew Wright Lent	*Highland*	Φ Δ Θ House
ls	Luke Francis Lovelock	*Troy*	3 M. S. N. C.
ls	John Aloysius Mahar	*Rensselaer*	Rensselaer
c	Carl Esselstyn McCombs	*Frankfort*	X Ψ Lodge
ee	James Edward Molony	*Schenectady*	816 State St.
s	Elbert Verity Mullenneaux	*Albany*	Ψ Y House
s	Henry Seymour Olmsted	*Chattanooga, Tenn*	ΦΓΔHouse

c JOHN FAY PUTNAM.....*Johnstown*.....Δ Υ Lodge
ge LAFAYETTE CLOW REYNOLDS.....*Schenectady*....15 Close St.
s ELBERT THEODORE RULISON, JR.*Schenectady*..1208 State St.
s ARCHIBALD H. RUTLEDGE.....*Santee, S. C*....**K A** Lodge
ls GEORGE EARL SMITH.....*Schenectady*.349 Romeyn St.
ee ROWLAND STEBBINS.....*New York City*..Ψ Υ House
ls CHARLES GOWDY STILES.....*Lansingburgh*...Ψ Υ House
ls WILLIAM CARL TREDER.....*Albany*.....Medical College
ge WINSLOW BARNES WATSON.....*Plattsburgh*.....S. S. S. C.
ge HARRY ROGERS WICKHAM.....*Schenectady*.Glenwood Bvd.

Seniors—27.

Juniors, Class of 1905

c FRANK RUDD ANDREWS.....*Yonkers*.....Χ Ψ Lodge
e CLARENCE STILMAN ARMS.....*Sidney*.....Δ Υ Lodge
ee JAMES HANNAH CUNNINGHAM.*Schenectady*..1101 State St.
ls ERNEST JUDSON ELLENWOOD.....*Dannemora*..... Δ Υ Lodge
ls GEORGE MYERS ELMENDORF.....*Alcove*..... Β Θ Π House
ee FRANK THORBURN FORSTER.....*Nyack*....515 Summit Ave.
ls LOUIS CHRISLER HART.....*Albany*.....**K A** Lodge
e NEIL CUMMINGS HOLDREDGE.....*West Burlington* ΒΘΠHouse
s THOMAS MILTON HOLMES.....*Albany*..... Δ Υ Lodge
e WILLIAM THEODORE HUNT.....*Otego*.....4 M. S. N. C.
e ERIC TURE KING.....*Rosebank*.....**A** Δ Φ House
ee MORLAND KING.....*Brooklyn*.....**A** Δ Φ House
e HERMAN CARL KLUGE.....*Elmira*.....9 N. S. N. C.

ee CARL RODERIC KRUEGER.....*Schenectady*..Wendell Ave.
ls FRANK IRA LOSEE.....*Fergusonville*..13 N.S. N.C.
s CHARLES MALCOLM MCGREGOR..*Gloversville*...Silliman Hall
c THOMAS EARL MCGUIRK.....*Albany*.....Δ Φ House
ee WILLIAM ORSON MORSE.....*Camden*.....204 Park Ave.
ee JOHN ROWLAND NOWELL.....*Anderson, S. C*..S. S. S. C.
e LEROY LEE ODELL.....*Poughkeepsie*.Β Θ Π House
c FREDERIC CURTIS PATTON.....*Rensselaer*....Α Δ Φ House
ee JOHN HENRY RAY.....*Rheims*...North Colonnade
c MORRIS THOMAS RAYMOND.....*Schenectady*..Α Δ Φ House
ee HERBERT EUGENE REEVES.....*Glens Falls*..629 Liberty St.
ee AQUILES RODRIGUEZ.....*Nuevitas, Cuba*..514 Union
e EDMUND GAILLARD SIMONS.....*Eutawville, S. C* Κ Α Lodge
e FRANK G. TAYLOR.....*Poultney, Vt*..744 E. Liberty
ls ALEXANDER J. THOMSON.....*Schenectady*.20 N.Church St
e KARL FREDERICK WEST.....*Caldwell*.....Κ Α Lodge
ee FRANK SPERRING WHEELER.....*Sidney*.....Δ Υ Lodge

Juniors—30.

Sophomores, Class of 1906

e LEVAN RANSOM BARNES.....*Clyde*.....Ψ Υ House
e LEROY BEERS.....*Schenectady*....28 Eagle St.
s WILLIAM LEROY BROOKS.....*Albany*.....Α Δ Φ House
ls FRANCIS BARRY CANTWELL.....*Malone*.....S. S. S. C.
e MELVIN DAVID CASLER.....*Johnstown*...8 N. S. N. C.
e ARNOLD G. CHAPMAN.....*Guilderland*.....Ψ Υ House

c PHILIP LUKE CLASSEN.....*Albany*..... Ψ Υ House
e EDWARD WARREN CLEEVES.....*Salisbury Mills*.7 N.S. N.C.
e EDGAR STONE CLOSSON.....*Gloversville*..... Δ Υ Lodge
c HARRY COOK.....*Albany*.....Φ Γ Δ House
e LEROY PIERCE COLLINS.....*Troy*.....Φ Γ Δ House
e ERNEST MONTGOMERY DANN....*Downsville*....Φ Δ Θ House
ls ERNEST WILLIS DAVIS.....*Schenectady*.Glenwood Bvd
e CHARLES STEVENS DWIGHT.....*Columbia, S. C.* Κ Α Lodge
e CHARLES EDWARD D. EGERTON..*Louisburg, N. C.*.S. S. S. C.
e HARRY DANIEL FULLER.....*Rochester*..... Δ Υ Lodge
s JAMES ELMER GILMOUR.....*Ogdensburg*..... Δ Υ Lodge
c PAUL JONATHAN HAGAR.....*Plattsburgh*...Β Θ Π House
s ARTHUR MERRILL HAGAR.....*Plattsburgh*...Β Θ Π House
e HARRY NELSON HAIGHT.....*Fishkill*.....Φ Δ Θ House
e GEORGE FRANCIS HALL.....*Albany*..... Φ Δ Θ House
ls GEORGE WALTER HITT.....*Unadilla*..... Δ Υ Lodge
e LESLIE GILBERT HOLLERAN.....*Hadley*..... Δ Υ Lodge
e CLAUDE KINNE HUSTON.....*Selma, Ala*.326 Summit Av.
ls DANIEL FERGUSON IMRIE.....*Caldwell*.....Δ Φ House
e WARNER KING.....*Brooklyn*.....Α Δ Φ House
c GEORGE B. LAUGHLIN.....*Saratoga Springs*.Δ Φ House
s LEON RAY LEWIS.....*Gilboa*....North Colonnade
s HERRICK MCCLENTHEN.....*Jefferson*.....2 N. S. N. C.
ls PAUL ALONZO MEAD.....*Schenectady*.... Χ Ψ Lodge
ls FLOYD LESLIE MILLER.....*Fort Plain*.....Δ Φ House
e JOHN LESLIE MOON.....*Cooperstown*..Φ Δ Θ House
e WALTER ERNEST NUTT.....*Hoosick*.....17 Jay St.
e JOHN ALOYSIUS O'DONNELL....*Salem*.....4 N. S. N. C.

e JOHN BRADBURY PEEBLES.....*Petersburg, Va.*..S. S. S. C.
e LEIGHTON HARTWELL PEEBLES..*Petersburg, Va.*..S. S. S. C
e SAMUEL JOHNSTON RAYMOND...*Buffalo*.....A Δ Φ House
c BYRON WILLIAM REED.....*Olean*.....Δ Υ Lodge
s LORENZO N. RIDER.....*Bath*.....Χ Ψ Lodge
e RAYMOND DERRICK SHERMAN...*Melrose*.....10 N. S. N. C.
s STANTON COLE SHERMAN.....*Salem*.....Κ Α Lodge
e ROLLAND BARKER SMITH.....*Peru*.....Δ Υ Lodge
e WILLIAM EDMUND STONEY.....*Pinopolis, S. C.* Κ Α Lodge
e HARRY ADELBERT SYLVESTER.....*Schenectady*.817 Locust Av.
c DEWITT C. VAN ZANDT, JR.....*Schenectady*..R. F. D. No. 1
e CARL OTTO VON DANNENBERG..*Stapleton*.....Α Δ Φ House
e MASON WILLIAM WADSWORTH..*Binghamton*...Α Δ Φ House
s CHARLES NEWMAN WALDRON...*Detroit, Mich*..M. S. N. C.
e JOHN GIBBON WEBB.....*Summerville, S. C.*S.S.S.C.
e NELSON PHILIP WEIER.....*Lyons*.....N. S. N. C.
c WALTER FANSTONE WELLMAN..*Schenectady*...922 State St.
ls MEADE LAFAYETTE ZIMMER.....*Gallupville*... Β Θ Π House

Sophomores—52.

Freshmen, Class of 1907

e ANDREW ORDELL AVERY.....*Delanson* .....Delanson
ls RAYMOND S. BENNETT.....*Schenevus*...14 N. S. N. C.
e HOWARD ELMER BISHOP.....*Sayre, Pa*....Φ Δ Θ House
c HOWARD HUNTINGTON BOLD.....*Watervliet*.....Ψ Υ House
s EARL CROUL BRADBEER.....*Detroit, Mich.* Α Δ Φ House

e	James G. Brennan	*Albany*	Δ Φ House
e	Peter James Brewster	*Newtonville*	Β Θ Π House
c	Cyrus Wilber Briggs	*Schenectady*.29 Wendell Av	
ls	Louis Maynard Bryant	*Le Roy*	Δ Υ Lodge
e	Hervey Edwin Butcher	*Oneida*	Ψ Υ House
e	Herbert Edward Cantwell	*St. Simons Island, Ga*	ΦΓΔ House
e	Henry Hooker Chapman	*Morristown*...2 S. S. S. C.	
e	William Bennett Colburn	*Detroit, Mich.*14 M. S. N. C.	
s	John White Crawford	*Madrid*	Β Θ Π House
ls	Willis David Curtiss	*Sodus*	Δ Υ Lodge
s	Thomas Darrow	*Princetown*...	Β Θ Π House
e	Fred Henry Davidson	*Cooperstown*..	Φ Δ Θ House
e	Hugh Garnett Davis	*Lynchburg, Va.*12 N.S. N.C.	
ls	Jesse Abram DeMey	*Sodus*	Δ Υ Lodge
e	Richard Sylvester Dillon, Jr.	*Rensselaer*	Rensselaer
e	Simeon Earl Dockstader	*Fonda*....113 Nott Terrace	
e	Stewart Dockstader	*Fonda*....113 Nott Terrace	
e	Victor Henry Durler	*Schenectady*..832 Union St.	
e	Francis Marion Edwards	*Atlanta, Ga*...	Φ Γ Δ House
c	Ralph Waldo Eldredge	*Sharon Sp'gs*.6 M. S. N. C.	
ls	Marcus Holladay Elliott	*Englewood, N. J.*.	ΦΔΘ House
e	Edward James Fairbairn	*Buffalo*	Α Δ Φ House
e	Arthur James Farrington	*New York City*.	Ψ Υ House
e	Nicholas V. V. Franchot 2d.	*Niagara Falls*....S. S. S. C.	
e	Leonard Hughes Frazier	*Amsterdam*..	Β Θ Π House
e	William Rensselaer Furbeck.	*St. Johnsville*...	Δ Υ House
s	Harold Gardiner	*Hadley*	Α Δ Φ House
ls	Fred. Girvin	*Schenectady*...708 Westover Ave.	

e EUGENE WATSON GOFF.....*Plattsburgh*..... Δ Υ Lodge
ls FRED COONLEY GRIFFEN.....*Middleburgh*.612 Chapel St.
e EARL EWAN HARVEY.....*Schenectady*.316 Clinton St.
e EDMUND FRANCIS HEARD.....*Schenectady*.1105 Union St.
s DUDLEY TOLL HILL.....*Schenectady*.1725 Union St.
e GORDON RUSSELL LANGLEY.....*Schenectady*...7 Park Ave.
e JOHN PATRICK LUCEY.....*Little Falls*.27 Lafayette St.
e ROBERT FULLER MAC MULLEN...*Schenectady*..519 Hamilton
e GEORGE MAURE, JR.....*Richmond Hill*..Δ Υ Lodge
ls WILLARD ANDREW MCCLELLAN..*West Hebron*. Α Δ Φ House
e WALTER T. MCINTOSH.....*Buffalo*.....9 M. S. N. C.
e BENJAMIN NOX MOOERS.....*Plattsburgh*.....S. S. S. C.
e FRANK LESLIE MOORE.....*French Mount'n*.1 M.S.N.C.
e FRED MUNK.....*Rockville Centre*, 1 S. S. N. C.
e FREDERICK WHITMAN NEWTON..*Buffalo* ....10 M. S. N. C.
e ALEXANDER JOSEPH NICHT, JR..*Auburn*.....11 N. S. N. C.
c GEORGE BURTON NOBLE.....*Jonesville*....7 M. S. N. C.
c EUGENE OLMSTEAD.....*Schenectady*..124 Park Ave.
e ERNEST BAXTER OSBORNE.....*Chicago, Ill*.....S. S. S. C.
c LEWIS STEWART PARSONS.....*Liberty*..... Δ Υ Lodge
e ROLLIN D. REED.....*Binghamton*...Van Vranken Ave.
e EL ROY SHIBLEY REEDER.....*Binghamton*.....Ψ Υ House
e LE RAY THOMPSON REEDER.....*Binghamton*.....Ψ Υ House
s FREDERICK WILLIAM REIMHERR..*Waterford* .....Waterford
s JAMES HENRY RICHARDS.....*Englewood, N. J.*.Φ Δ Θ House
e GLENN ELLISON RICHARDSON....*Herkimer*.....Ψ Υ House
ls EDWIN HAZELETT ROBINSON....*Watervliet* .....Watervliet

e William Clement Robinson... *Watervliet* .....Watervliet
e Everett Irving Rogers, Jr..... *Providence, R. I.* Δ Υ Lodge
e Theodore de J. de Sabla, Jr.... *Platteclove*....Α Δ Φ House
e John LeRoy Sawyer..... *Cherry Valley*..Χ Ψ Lodge
e Edwin Mathias Secrist..... *Swounville*..620 Chapel St.
e James Thomas Shuttleworth. *Amsterdam*...Β Θ Π House
s Reuben Peckham Sleicher... *Albany*.....Χ Ψ Lodge
e William Stuart Speir..... *Albany*..... Ψ Υ House
e Ralph Winne Stearns..... *South Berlin*..420 Crane St.
s Leslie Hudson Stowe..... *Mooers*..... Β Θ Π House
e Robert Childerhouse Switzer.. *Menands*..... Β Θ Π House
c William Foster Taylor..... *Schenectady*..8 M. S. N. C.
e Donald Mac Donald Thurber. *Detroit, Mich*.16 M. S. N. C.
e Allrich Sanford Tiedeman.... *Schenectady*..511 Smith St.
e Peter Willoughby Traynor... *Owego*.....2 N. S. N. C.
c Alton Tredick ..... *Chicago, Ill*.....Δ Φ House
e Ralph Trumbull..... *Johnstown*.....Δ Φ House
e Louis Wachtel..... *Gloversville*..12 S. S. N. C.
e Paul Wait..... *Fort Edward*.418 Union St.
e Charles Ray Waters..... *Avoca*.....Φ Δ Θ House
e William Earl Weller..... *Schenectady*.614 Chapel St.
e Royton F. Wheadon..... *Johnstown*.....Δ Φ House
c Albert Huntley White..... *Schenectady*.20 Union Ave.
e Ernest Daniel Wilmot..... *Malta*.....13 S. S. N. C.
e Ernest Macmillan Wilson... *Hebron*.....3 N. S. N. C.
e Clarkson C. Wormer, Jr..... *Detroit, Mich*.15 M. S. N. C.

Freshmen—86.

Irregular Students

(05 *e*) Elvin Jay Becker.....*Middleburgh*.So. Colonnade
(04 *s*) Joseph Gilbert Cool.....*Glens Falls*.....K A Lodge
(04 *e*) William Clark Durant...*Saratoga Springs*.XΨLodge
(05 *e*) James Michael Gagen.....*Amsterdam*..So. Colonnade
(04 *ls*) Edward D. Greenman.....*Albany*.....X Ψ Lodge
(06 *e*) Wm. Comstock Landreth..*Schenectady*....College Hill
(06 *e*) Thomas Joseph Mooney...*Schenectady*.510½ State St.
(06 *e*) George Chapman Newbury.*Goshen*.....Ψ Y House
(04 *c*) Samuel Dimock Palmer...*Ogdensburgh* .A Δ Φ House
(04 *e*) George Vaughn Sherrill...*Sandy Hill*.....Ψ Y House
(05 *ls*) James Rose Stevens, Jr....*Cohoes*.....Φ Γ Δ House

Irregular Students—11.

Graduate Students

Arthur Lofgren.....*Brazil*.....703 Union St.
Thiago Vieira Monteiro.....*Brazil*.....703 Union St.

Graduate Students—2.

Graduate Course in Electrical Engineering

JULIUS ALSBERG, Columbia,.....131 North Ferry St.
C. B. BLACKBURN, B. S., 1894, Victoria Univ..410 Schenectady St.
O. F. BRUMAN, Smithsonian Inst.....5 Park Place.
S. W. COLEMAN, Univ. of California.....618 Chapel St.
F. E. COOLEY, Univ. of California.....785 State St.
C. C. CROW, University of California.....107 Lafayette St.
G. H. DAVIS, Univ. of Maine.....316 Germania Ave.
O. F. FERGUESON, B. S., 1903, Univ. of Nebraska....1239 State St.
GEORGE GOLDMAN, University of California.....160 Lafayette St.
F. GUNTHER, B. E., 1903, North Carolina College...615 State St.
H. H. HESS, E. E., 1898, Lehigh.....Box 125, Scotia, N. Y.
OTTO HOLZ.....117 Nott Terrace
F. S. HUNT, Univ. of Nebraska.....1219 State St.
F. H. JEANNIN.....957 State St.
H. L. JONES, Penn. State College.....615 State St.
A. S. KAPELLA, E. E., 1895, Lehigh.....1010 State St.
ELIJAH LEWIS, Armour Inst. Tech..... ....106 Park Ave.
MARTIN LIDE, Ala. Polytechnic Inst.....624 Chapel St.
A. S. LOIZEAUX, M. E., 1899, Stevens.....31 Chestnut St.
C. MACMILLAN, Glasgow Univ.....631 Chapel St.
LAWRENCE MANNING, Va. Polytechnic Inst.211 Brandywine Ave.
H. MAXWELL, B. S., 1900, Kansas.....P. O. Box 778
EZRA B. MERRIAM, B. T. S., '00.....P. O. Box 778
K. MCCASKILL, B. S., McGill.....207 Victory Ave.
J. K. OSTRANDER, Purdue Univ.....43 Front St.

M. E. Pfau, E. E., 1899, Winterthur College, Switzerland. 41 Front St.

G. W. Sanders, E. E., 1901, Stevens.....North College

H. B. Spencer, University of Vermont.....16 Swan St.

P. E. Smith, Penn. State College.....617 State St.

Walter L. Upson, Princeton.....43 Front St.

M. H. Wells, Syracuse Univ.....P. O. Box 279, City.

H. Wohlauer, E. E., Berlin.....211 Liberty St.

N. H. Yout, B. S., 1903, Univ. of Nebraska.....230 Union St.

Special Graduate Students—33.

Summary of Students, Union College

Seniors	27
Juniors	30
Sophomores	52
Freshmen	86
Irregular Students	11
Graduate Students	2
Special Graduate Students	33
Total	241

STUDENTS OF THE ALBANY MEDICAL COLLEGE

Fourth Year.

James Marmaduke Boddy, A. M.....Troy
Palmer Romaine Bowdish.....Cornwall-on-Hudson
George Lay Branch.....East Springfield
Charles William Chapin.....Unadilla Center
Guy Forsyth Cleghorn.....Green Island
Chester Thomas Cobb.....Easthampton, Mass.
Thomas Folwell Cole.....Romulus
John Isaac Cotter.....Poughkeepsie
Marcus Albert Curry.....Johnsonville
Arthur Thomas Davis.....Utica
William Sebastian De La Hoyde.....Brooklyn
Bransen Keemper De Voe.....Albany
Malcolm Douglas, A. B.....Albany
Thomas Joseph Dowd.....Cohoes
Silas Lorenzo Filkins.....Albany
Leland Delos Fosbury, A. B.....Sidney
Joseph N. Bennett Garlick.....Albany
William Entwistle Garlick.....Fall River, Mass.
Charles Erastus Green, M. D.....Brooklyn
Everal Caleb Haviland.....Wolcott
Harold Eliphalet Hoyt, A. B.....Cambridge
George John Jennings.....Ballston Spa
William George Keens.....Albany
Arthur Charles Kline.....Port Leyden

George Spencer Lape.....Mechanicville
Harry Lovejoy Loop.....Cohoes
William Thomas Manion*.....Waterford
Walter Mott, M. D.†.....Watervliet
Dennis Alphonsus Murphy.....Gloversville
Robert Joseph O'Brien, Jr., B. S.....Watervliet
Daniel Vincent O'Leary, Jr.....Albany
Joseph Day Olin, A. B.....Watertown
John Hendry Reid.....Troy
Burt Luverne Shaw, Ph. G.....Troy
Benjamin John Singleton.....Glens Falls
Edward Augustine Stapleton.....Hoosick Falls
Arthur Wesley Thomas.....Middle Granville
Chester Erastus H. Tracy.....Troy
Richard Henry Van Denburg.....Medway
Frank Barton Wheeler.....Troy
Frank Edward White.....Union
George David Wilde.....Cranesville
Guy Vail Wilson.....Masonville
Maurice Wolkowitz Wolff.....New York City
Trevor Crandall Yates.....New Lisbon

Fourth Year Students—45.

*Matriculant only. †Special Course.

Third Year.

Kenneth Daniel Blackfan.....Cambridge
Homer Andrew Bushnell.....North Adams, Mass.

George Morris Casey.....Schuylerville
Archie Bert Chappelle.....Kingston
Arthur Preston Clark.....Albany
Kenn Romeo Coffin.....Cooperstown
Miles Jacob Cornthwaite.....Troy
John Henry Farnian Coughlin.....Troy
Walter Allen Cowell, A. B.....Albany
John Dixon Crane.....Hawley, Pa.
Orrel Charles Curtis.....South Egremont, Mass.
Theodore David Dockstader.....Sharon Center
Patrick John Donahoe.....Albany
William Mulvihill Dwyer.....Amsterdam
John Peter Faber.....Albany
Fred Edward Gremore Flanagan.....St. Regis Falls
Thomas Joseph Flynn.....Johnstown
Perlia Elijah Garlock.....Sprakers
William Joseph Garvey.....Troy
Charles William Louis Hacker.....Albany
Walter Ennis Hays, A. B.....Albany
Chester Alan Arthur Hemstreet.....Waterford
Thurman Alson Hull.....Williamstown, Mass.
Lemuel Rankins Hurlbut.....Troy
Frank James Hurley.....Bennington, Vt.
Matthew Joseph Keough.....Cohoes
Oscar Franklin Larson.....Poultney, Vt.
Edward Miltimore.....Catskill
Francis Joseph Noonan.....Troy
George Washington Papen, Jr.....Albany

HERBERT BOWEN REECE.....Troy
WILLIAM GARFIELD ROMMEL.....Troy
HENRY STANTON ROWE, JR., A. B.....Cohoes
HARRY RULISON.....Albany
FRANK GEORGE SCHAIBLE.....Albany
JOHN RALPH SCHERMERHORN.....Randall
FREDERICK FOSTER SCHIRCK.....Saratoga Springs
ARTHUR HAMILTON SCHUYLER.....Fonda
FRANCIS JOSEPH SCOTT.....Cohoes
BENJAMIN FRANKLIN SEAMAN.....Matteawan
HAMILTON MUNN SOUTHWORTH.....Nassau
CHARLES WILLIAM STRATTON.....Lee, Mass.
CHARLES CLARK SWEET.....Petersburg
JAMES HARVEY VAN BUREN.....Jefferson
EDWARD HELLIS VINES.....Saratoga
GEORGE WALRATH.....St. Johnsville
ALFRED LEROY WARNER.....Troy
ROSCOE CONKLING WATERBURY.....Nassau
JAMES WATSON WHITE.....Wappingers Falls
EDWIN BARNES WILSON, A. B.....Hudson

Third Year Students—50.

Second Year.

HENRY FRANCIS ALBRECHT.....Troy
FRED NICHOLAS BIBBY.....Pottersville
JOHN BREEN.....Wevertown
ROY MUNRO COLLIE.....Johnstown

Morey Charles Collier, Ph. B.....Savona
Charles Elisha Collins, Ph. G.....Troy
Frederic Charles Conway.....Albany
Adelbert Stephen Dederick.....Cohoes
William Charles Dievendorf.....Currytown
Theobald Frederick Doescher.....Albany
Lee Roy Dunbar.....Gloversville
Willis Woodford Dutcher.....Albany
Vernon R. Ehle.....Gloversville
Hermon Ernest Gak.....Fairmont
George Reinhold Goering.....Utica
Stowell Boroughs Grant.....Afton
Percival William Harrig.....Albany
Joseph Friend Harris.....Albany
Clinton Benjamin Hawn, B. S.....Albany
Samuel Orestes Kemp.....Albany
Winfield Snell Kilts.....Fort Plain
William Andrew Krieger.....Poughkeepsie
Price Lewis.....Holland Patent
Floyd Dempster Michael.....Lassellsville
James Edward Maloney.....Albany
David Cushing Nolan.....Albany
Irving Deyo Pell.....Hudson
Charles Albert Prescott.....North Creek
Walter Ancel Reynolds.....Albany
John Fletcher Robinson.....Albany
William Nelson Simons.....Canajoharie

LEMON DWIGHT WASHBURN.....Fort Ann
EDWARD GORE WHIPPLE.....Malone

Second Year Students—33.

First Year.

CHARLES SANFORD ALLEN, JR.....Rensselaer
FLOYD JEROME ATWELL.....Oaksville
JOHN ADKIN BATTIN*.....Watervliet
GEORGE WARREN BEEBE.....Johnstown
JOSEPH LEWI BENDELL, A. B.....Albany
EDWARD GEORGE BENSON.....Albany
WILLIAM ARTHUR BING.....Castleton
WILLIAM J. BOLTON*.....Poughkeepsie
HENRY PHILIP CARPENTER.....Highland
WILLIAM DAVID COLLINS, A. B.....Green Island
ERASTUS CORNING, A. B.....Albany
MARCUS DENIS CRONIN.....Welton
WALTER THOMAS DIVER.....Troy
JOSEPH LEWI DONHAUSER.....Albany
ALFRED THOMAS GABRIELS, A. B.....Watervliet
LOUIS HERBERT GAUS.....Albany
EDWARD COCHRAN GOW.....Schuylerville
ALFRED WOODWARD GROVER.....Kingston, Pa.
ALEJANDRO BUITRAGO GUILLIOD.....Guayama, Porto Rico
AUGUSTUS JOSEPH HAMBROOK, JR.....Troy
JAMES EDWARD HOURIGAN.....Schenectady
CHARLES MCMANUS HYNES.....Troy
EDWARD WILLIAM JACKSON.....Little Falls

DEAN WARDELL JENNINGS.....Cairo
CLARENCE ROBERT KAY.....Amityville
ROY CHARLES KEIGHER.....Schenectady
DAVID KIDD .....Troy
RICHARD ANDREW LAWRENCE, A. B.....Albany
TIFFANY LAWYER .....Albany
JACOB HENRY LINDEN.....Sharon Springs
ROBERT SUTTONFIELD LIPES.....Nassau
JOHN SEARS MCCORMACK.....Albany
ZENAS VAN DUZEN ORTON.....Northampton
LYMAN C. PETTIT*.....Saratoga Springs
WILLIAM CLARE PORTER.....Lestershire
JAMES WILLIAM RAFFERTY, A. B.*.....Troy
STEPHEN JOHN HENRY REED.....Schenectady
FRANCIS RAYMOND RILEY**.....Cohoes
WILLIAM FIERO RUSSELL**.....Saugerties
JAMES JOSEPH SHEA.....Hoosick Falls
ROBERT THOMAS SKELTON**.....Kingston
HENRY SWEDLOW .....Albany
WILLIAM CARL TREDER.....Albany
IRVING BLAINE WALKER*.....Schenectady
HERBERT JOHN WRIGHT.....Rhinebeck

First Year Students—45.

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*Matriculant only. **Left college.

STUDENTS OF THE ALBANY LAW SCHOOL

Senior Class.

JOHN P. BADGER, JR.....Malone
HENRY S. BAHLER, A. B., Union.....Schenectady
MARK B. BENNETT.....Hammondsport
LESTER W. BLOCH, PH. B., Union.....Albany
EDWARD R. BOOTEY.....Jamestown
CHARLES E. BRENNAN.....Albany
FRANK C. BROWN.....Porter
LESTER BROWNELL.....Caledonia
WILLIAM T. BYRNE.....Albany
WILLIAM J. CAHILL, Manhattan College.....Albany
STEPHEN E. CHAFFEE.....Liberty
D. VEEDER CLUTE, B. S., Union.....Schenectady
LEWIS J. CONWAY, Manhattan College.....Troy
ROBERT B. CRAFT, New York University.....Roxbury
R. DUNGLISON CRAMER.....Waterford
HARRIE MCKELVEY CURTIS.....Coxsackie
HENRY DELAMATAR, JR., Cornell.....Hudson
MILTON DEVOE.....Albany
NICHOLAS DEVOE.....Albany
NIRAM DEVOE.....Albany
JOHN E. DIEFENDORPH.....Albany
NELSON L. DRUMMOND, A. B., Hamilton.....Auburn
ROBERT B. DUDLEY.....Elizabethtown
DANIEL A. DUGAN.....Fishkill

EDWARD EASTON, JR., A. B., Yale.....Albany
MAURICE B. FLINN.....Albany
JOHN M. HACKETT.....Hyde Park
SAMUEL M. HAIGHT.....Mabbettsville
ROBERT B. HANER.....Albany
GEORGE J. HATT 2nd, A. B., Williams.....Albany
ARTHUR HOAG.....Plattsburgh
CHARLES L. HOEY.....Saratoga Spa
EDWARD C. JAMIESON.....Hopedale, Mass.
GEORGE W. JOHNSON.....Mexico
CLARENCE S. LA MONT.....Cobleskill
GEORGE M. LUNDY.....Olean
CHARLES W. MARSHALL.....Troy
QUINCY MCGUIRE.....Albany
LAWRENCE B. MCKELVEY, Colgate.....Waterford
HARRY R. MERRILL, Cornell.....Schenectady
GEORGE B. ODWELL.....Dowersville
CHARLES E. PALMER, JR., A. B., Union.....Schenectady
FREDERIC L. REIGLE.....Auburn
WILLIAM C. ROCHE.....Troy
TIMOTHY ROLAND.....Albany
J. CRAIG ROBERTS.....Nunda
DAVID C. SALYERDS.....Scottsville
LOUIS B. SHAY, A. B., Howard.....Morton
GEORGE H. SMITH, B. S., Colgate.....Hamilton
PETER G. SMITH.....Webster
THOMAS M. SMITH, Cornell.....Union Springs
DEL. B. SOLMON.....Potsdam

FRANK L. STILES, PH. B., Union.....Troy
JAMES W. SUTTON.....Oswego
MARSH N. TAYLOR, Rochester University.....Rochester
BENJAMIN TERK.....Glens Falls
HERBERT B. THOMAS.....Rochester
FRANCIS X. THOMPSON.....Albany
JOHN M. TIERNEY.....Plattsburgh
CHARLES J. TOBIN.....Albany
JOHN T. VAN VALKENBURGH, JR.....Waterford
HENRY W. VAN ALLEN, State Normal College.....Niversville
JOHN W. VAN ALLEN, PH. B., Hamilton.....Carthage
HAROLD WILSON, JR.....Clarmont
ROBERT N. WILSON.....Hebron

Seniors—65.

Junior Class.

HAROLD ADAMS.....West Haven, Vt.
LEWIS M. AUSTIN.....Union Valley
WYMAN S. BASCOM.....Fort Edward
HENRY W. BENTON.....Saratoga Spa
MONTGOMERY P. BIGGAM.....Albany
CHARLES S. BODMAN, JR.....Gouverneur
JOHN W. COLLOPY, JR.....Troy
CHARLES C. CHAPPELL.....Kingston
VINCENT CUDDABACK.....Waterloo
GEORGE W. DONNAN, A. B., Union.....Troy
DANIEL S. FLINN.....Albany

JOSEPH G. FENSTER, B. S., Union.....Troy
CARL H. GALLUP.....Albany
GEORGE E. GRIFFEN.....Albany
JAMES A. HATCH, Williams.....Chittenango
CHARLES A. HIGGS.....Brocton
HENRY D. KERR.....Los Angeles, Cal.
ARTHUR LA MARCHE.....Plattsburgh
JOSHUA J. LANTRY.....Hoganburg
HERMAN LAVERY.....East Otto
GEORGE F. LAWRENCE.....Manchester, Vt.
JOHN J. LAWRENCE.....Schenectady
MARTIN T. LYNCH.....Albany
GORDON B. MCCARTHY.....Watertown
SHERMAN A. MURPHY.....Albany
FRED. W. PRATT.....Sherman
CLINTON R. QUINBY.....Rochester
ABRAM ROOS, JR.....Kingston
GEORGE V. SCHENCK.....Rensselaer
DONALD J. SHOECRAFT.....Webster
CLAIRE SINCLAIR.....Bath
JOHN A. SLADE.....Saratoga Spa
GEORGE J. SLEICHER.....Albany
ALBERT E. SMITH.....Albany
FRANK M. SMITH.....Springfield Centre
J. TAYLOR SMITH.....Delmar
FRED T. STETSON.....Champlain
SCHUYLER K. SWEETING.....Dolgeville
WALTER S. THROOP.....Port Gibson

THOMAS R. TILLOTT, JR., B. S., Union.....Schenectady
HENRY F. TOOHEY.....Schuylerville
ALFRED VAN BUREN.....Kingston
JOSEPH H. VAN DERLYN.....New Paltz
GEORGE S. VAN HORN.....Cooperstown
THOMAS WOODS.....Albany
WILLIAM WASSERMAN.....Amsterdam
WILLIAM B. ZIMMER.....Rochester

Juniors—47.

STUDENTS OF THE ALBANY COLLEGE OF PHARMACY

Senior Class.

Clarence Leroy Blakely.....Waterbury, Conn.
Arthur Kingsley Brown.....Chatham
Chester John Brown.....Malone
James Francis Colwell.....Waterbury, Conn.
William Martin Condon.....Troy
Carlton Rood Croff.....Carthage
Arthur James Doran.....Troy
Leon Edward Gray.....Cairo
Fred Stanley Heimer.....Hamden
Charles Ferris Holley.....Kingsbury
Walter Kenyon.....Northampton
William Christopher Komfort.....Albany
William Maurice Lange.....Albany
John James Mackintosh.....Saratoga Springs
David Stephen McCulloch.....Ravena
Henry William Millette.....Champlain
Bernard Benedict Murphy.....Glens Falls
Cornelius James Murphy.....Albany
Jacob Pinkinson.....New York City
Elmer Warren Rice.....Westport
Henry Frederick Smith.....Troy
Frank Fullerton Stevenson.....Argyle
William David Thomas.....Granville

HOWARD CAMPBELL WEIDMAN.....Albany
HIRAM MOORE WELLS.....Glens Falls

Seniors—25.

Junior Class.

FRED GREENOUGH ATWELL.....Cohoes
HARRY THOMAS AVERY.....Hunter
HENRY FLOYD BANTA.....Hagaman
CHARLES WILLIAM BURDICK.....Saratoga Springs
DAVID DOBY CARPENTER.....Plattsburgh
ARTHUR JAMES CURTIS.....Watervliet
CHARLES EASTON DEVENBURGH.....Amsterdam
CHAUNCEY GEORGE DOUGLAS.....Saratoga Springs
GEORGE ARTHUR ELLIOTT.....Holyoke, Mass.
CHESTER ANDREW GALLAGER.....Schenectady
CHARLES EDWARD GRAMP.....Hudson
FRANK LE ROY HALEY.....Hoosick Falls
ROBERT RALPH HIGGINS.....North Creek
HENRY HEINMILLER.....Albany
FRED ARUTHUR JOHNSON.....North Creek
FRANK GEORGE KILLIGREW.....Holyoke, Mass.
JOHN CHARLES KONIECZNY.....Schenectady
HENRY RAYMOND LIDDLE.....Johnstown
ALEXANDER LINN.....Hamburg, N. J.
HARRY JENNER LOVEYS.....Johnstown
GEORGE WESLEY MATHER.....Cohoes
PELEG AUSTIN MATTESON.....Shaftsbury, Vt.
JOHN HENRY MCKEON.....Bennington, Vt.

William Francis Nagle.....Chicopee, Mass.
Arthur Le Roy Neher.....Schenectady
Agnes Josephine Quinlan.....Bennington, Vt.
Herbert Clarence Reffelt.....Beacon Falls, Conn.
Herbert Cornelius Wyncoop Retallick.....Canajoharie
Clifford Harvey Rudes.....Dolgeville
Harry Sholtes.....Schoharie
Edward David Shoor.....Albany
Ira Walker Smith.....Nicholville
Robert Bruce Smith.....Plattsburgh
Howard Mead Tice.....Cincinnatus
William Charles Tiernan.....Albany
Edgar Leonard Walker, Jr.....Moriah
Harry Waltermire.....Chatham
Alvin Le Roy Woodruff.....Sandy Hill

Juniors—38.

Summary of All Students

Union College	241
Albany Medical College	173
Albany Law School	112
Albany College of Pharmacy	63
Total	589

UNION COLLEGE

ACADEMIC DEPARTMENT OF

UNION UNIVERSITY

SCHENECTADY, N. Y

UNION COLLEGE

Union College was incorporated by the Regents of the University of the State of New York on the 25th day of February, 1795. It was the second college incorporated in the State, and the first north of the city of New York and west of the Hudson River. It received its name from the circumstance that several religious denominations co-operated in its organization, and was the first college in the United States which was not of a strictly denominational character. It has continued from its foundation to be a representative institution of Christian unity.

The first president of Union College was the Rev. John Blair Smith, of Philadelphia. He was elected in 1795, and resigned in 1799, only a few months before his death. He was succeeded by Jonathan Edwards, the younger, who died in 1801. The Rev. Jonathan Maxcy, previously president of Brown University, succeeded Dr. Edwards, and resigned at the end of two years. In 1804 the Rev. Eliphalet Nott was elected president of Union College, which office he held until his death, on the 29th day of January, 1866. The Rev. Laurens P. Hickok, a graduate of the College, who had long acted as vice-president, was elected his successor. He resigned in 1868. The Rev. Charles A. Aiken succeeded Dr. Hickok in 1869, and resigned in 1871. The Rev. Eliphalet Nott Potter was elected president in 1871, and inaugurated June 20, 1872. On his resignation, in 1884, the Hon. Judson S. Landon, LL. D., was appointed president *ad interim,* and served until the inauguration of Harrison E. Webster, LL. D., who was elected president May 23, 1888, and inaugurated June 26, 1888. On his resignation, in January, 1894, Rev. Andrew V. V. Raymond, D. D., LL. D., was elected president, and inaugurated in June, 1894.

OFFICERS OF UNION COLLEGE

Trustees

Ex-Officio.
- His Excellency BENJAMIN B. ODELL, Jr., Governor.
- Hon. FRANK W. HIGGINS, Lieut.-Governor.
- Hon. JOHN F. O'BRIEN, Secretary of State.
- Hon. NATHAN L. MILLER, Comptroller.
- Hon. JOHN G. WICKSER, Treasurer.
- Hon. JOHN CUNNEEN, Attorney-General.

SILAS B. BROWNELL, LL. D., 71 Wall street, New York.

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Hon. JUDSON S. LANDON, LL. D., Schenectady.

Hon. EDWARD W. PAIGE, LL. D., 46 Cedar street, New York.

Rev. DENIS WORTMAN, D. D., Hyde Park, East Orange, N. J.

Hon. JOHN H. STARIN, Pier 18, N. R., New York.

Hon. JOHN A. DeREMER, A. M., Schenectady.

CLARK BROOKS, A. M., 155 Broadway, New York.

Rev. GEORGE ALEXANDER, D. D., 10th street and University place, New York.

Hon. WARNER MILLER, LL. D., Herkimer.

Hon. NICHOLAS V. V. FRANCHOT, A. M., Olean.

WILLIAM B. RANKINE, A. M., Niagara Falls.

Hon. DANIEL S. LAMONT, 35 Wall street, New York.

Hon. GEORGE F. SEWARD, LL. D., 97 Cedar street, New York City.

EDWIN W. RICE, Jr., Ph. D., Schenectady, N. Y.

EDWARD P. WHITE, A. M., Amsterdam, term of office expiring June, 1904.

FREDERICK W. CAMERON, A. M., Albany, term of office expiring June, 1905.

Rev. PHILIP H. COLE, D. D., Syracuse, term of office expiring June, 1906.

Prof. FRANKLIN H. GIDDINGS, LL. D., 150 West 70th street, New York, term of office expiring June, 1907.

Finance Committee

Hon. Judson S. Landon, LL. D., Hon. John H. Starin.
Hon. John A. DeRemer, A. M. Clark Brooks, A. M.
William B. Rankine, A. M.
Hon. Nicholas V. V. Franchot, A. M.

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Rev. George Alexander, D. D.
Rev. Philip H. Cole, D. D. Rev. William Irvin, D. D.
Prof. Franklin H. Giddings, LL. D.

Treasurer

Frank Bailey, A. B.

Secretary

Edward P. White, A. M.

FACULTY

ANDREW V. V. RAYMOND, D. D., LL. D.,
President.

BENJAMIN H. RIPTON, PH. D., LL. D.,
Dean and Professor of History and Sociology.

WILLIAM WELLS, PH. D., LL. D.,
Professor Emeritus of Modern Languages and Literature, and Lecturer on Current History.

SIDNEY G. ASHMORE, A. M., L. H. D.,
Professor of the Latin Language and Literature.

THOMAS W. WRIGHT, A. M., PH. D.,
Professor of Mathematics.

FRANK S. HOFFMAN, A. M., PH. D.,
Professor of Mental and Moral Philosophy.

OLIN H. LANDRETH, A. M., C. E.,
Professor of Civil Engineering.

WENDELL LAMOROUX, A. M.,
Librarian Emeritus.

JAMES H. STOLLER, A. M., PH. D.,
Professor of Biology and Geology.

EDWARD EVERETT HALE, JR., PH. D.,
Professor of English.

CHARLES P. STEINMETZ, A. M., PH. D.,
Professor of Electrical Engineering.

JOHN I. BENNETT, A. B.,
Professor of the Greek Language and Literature.

HOWARD OPDYKE, A. B.,
Professor of Physics.

FRANK B. WILLIAMS, C. E., M. S., PH. D.,
Assistant Professor of Engineering.

RICHARD S. CURTISS, PH. D.,
Assistant Professor of Chemistry.

FREDERICK EDWARDS, C. E.,
Assistant Professor of Surveying and Drafting.

JOHN LEWIS MARCH, A. M., PH. D.,
Assistant Professor of Modern Languages.

R. NEIL WILLIAMS, E. E.,
Assistant Professor of Electrical Engineering.

HERBERT L. TOWNE, A. B., M. D.,
Instructor in Physical Culture.

CLARENCE T. COLEY, M. E.,
Instructor in Electrical Engineering.

CARL A. KRAUSE, A. M.,
Instructor in Modern Languages.

C. F. F. GARIS, PH. B.,
Instructor in Mathematics.

GORDON E. VAN LOON, A. B.,
Instructor in Modern Languages.

JOHN C. PARKER, A. M.,
Instructor in Electrical Engineering.

FRANK COE BARNES, PH. D.,
Instructor in Modern Languages.

JOSEPH R. BROWN, JR., B. S.,
Librarian.

Lecturers

HAMILTON W. MABIE, LL. D.,
Lecturer on English Literature.

CARL A. ERNST, PH. D.,
Lecturer on Electrochemistry.

COLLEGE OFFICERS

FRANK BAILEY, A. B.,
Treasurer.

CHARLES B. POND,
Assistant Treasurer.

WENDELL LAMOROUX, A. M.,
Librarian Emeritus.

JAMES H. STOLLER, PH. D.,
Curator of the Museum.

MRS M. L. PEISSNER,
Registrar.

JOSEPH R. BROWN, JR., B. S.,
Librarian.

HERBERT L. TOWNE, M. D.,
Director of Gymnasium.

GEORGE CLUTE,
Superintendent of Grounds and Buildings.

Standing Committees of the Faculty

EDUCATION.—Professors Ripton, Wells, Ashmore, Wright, Hoffman, Landreth, Stoller, Hale, Steinmetz, Opdyke, Bennett, March, Curtiss and Dr. Towne.

LIBRARY.—Professors Hale, Wright and March.

CATALOGUE.—Professors Opdyke, Hale and March.

SCHOLARSHIPS.—Professors Ripton, Stoller, Bennett and March.

STAGE APPOINTMENTS.—Professors Wright, Stoller and Edwards.

ATHLETICS.—Professors Opdyke and Bennett and Dr. Towne.

RULES.—Professors Ashmore, Wright and Hoffman.

ADMISSIONS.—Professors Ripton, Hale, Ashmore, Wright, Landreth, Opdyke, Bennett, March and Dr. Towne.

DISCIPLINE.—Professors Ripton, Landreth, Hale, Bennett, March and Opdyke.

MUSIC.—Professors Bennett and March and Mr. Parker.

PREPARATORY SCHOOLS.—Prof. Edwards, Messrs. Garis, Coley, Van Loon and Brown.

EMPLOYMENT BUREAU.—Professor Stoller, Dr. Towne and Mr. Coley.

SENIOR CLASS.—Professors Stoller, Ashmore and Curtiss.

JUNIOR CLASS.—Professors Hoffman and Bennett and Mr. Krause.

SOPHOMORE CLASS.—Professors Hale and Opdyke and Mr. Williams.

FRESHMAN CLASS.—Professors March and Edwards and Mr. Garis.

COURSES OF STUDY

1.—Course leading to the degree of A. B.

This is the usual classical course. Latin and Greek are required for two years, and are elective for the remainder of the course. French and German are included, in addition to the ancient languages.

2.—Course leading to the degree of Ph. B.

This course offers Latin without Greek, for which is substituted additional work in modern languages and science.

3.—Course leading to the degree of B. S.

This course is based upon the study of mathematics and the sciences, with extended work in English and other modern languages.

In courses 1, 2 and 3 the greater part of the work of the last two years is elective.

4.—General Engineering course leading to the degree of B. E.

This course is intended to give the basis of an Engineering education, including the fundamental principles of all special branches of the profession, a knowledge of both French and German and a course in English.

5.—Sanitary Engineering course leading to the degree of B. E.

This differs from course 4 in substituting special work in Sanitary Engineering for some of the General Engineering studies.

6.—Electrical Engineering course leading to the degree of B. E.

This course is intended to give a broad and thorough Engineering education, with the specific instruction requisite for Electrical Engineering.

7.—Graduate course in Electrical Engineering leading to the degree of E. E.

This course, of one year's graduate study, consists of lectures, laboratory and research work, under electrical engineers of the General Electrical Co., and is open to graduates of the Electrical Engineering course of Union College or of any other institution of a standing recognized by the Faculty.

Students having the profession of Medicine in view are permitted to take the first year studies of the Albany Medical College as a substitute for the studies of the first two terms of the Senior year in Union College. This enables medical students to lessen the time of their academic and professional studies by one year.

For tuition charges, see page 112.

ADMISSION

General Conditions

The regular entrance examinations are held on the Thursday and Friday immediately following Commencement, and on the Tuesday, Wednesday and Thursday of the first week of the Fall term, as indicated in the calendar; also, at the opening of any term.

Candidates are recommended to take, if possible, the uniform entrance examinations offered by the College Entrance Examination Board, which are held annually in many places. Information concerning the time and place for these examinations can be obtained by writing to *College Entrance Examination Board, Post-Office Sub-Station 84, New York, N. Y.*

Candidates must be at least sixteen years old, and, as a preliminary to the entrance examinations, they must present to the President satisfactory testimonials of character, and register (see page 68) for the necessary examinations.

Candidates from other colleges must bring letters of honorable dismissal, and must pass satisfactory examinations, or present acceptable certificates.

Candidates for a degree must enter before the close of the first Senior term.

All candidates will be examined in the English requirements, but in other subjects Regents' diplomas or certificates from schools approved by the Faculty will be accepted, so far as they cover the requirements. Regents' pass-cards will be accepted, if they cover all the subjects required in any department. Blank certificates, to be filled out by principals of schools, will be furnished upon application to the Dean.

Students who enter the Freshman class by certificate and fail to maintain their class standing cannot enter the next Freshman class, except by passing the entrance examinations in the departments in which they have failed.

Candidates for any other than the Freshman class are examined also in all studies previously pursued by that class.

Requirements for Examination in 1904

I. A. B. COURSE

Candidates for admission to the course leading to the degree of A. B. will be examined in the following subjects:

1.—ENGLISH.

All candidates for admission to the Freshman class will be required to pass a written examination in English, and no candidate will be admitted whose work is seriously defective in spelling, punctuation, grammar, or division into paragraphs.

Questions will be set on topics and extracts drawn from the following books. The first list consists of works to be read carefully, with a view to the absorption of the subject matter, *i. e.*, as books are generally read. The second list consists of books to be read with critical care, in annotated editions, and with reference to dictionary, grammar and rhetoric. The questions on this set will relate to literary form and logical structure, as well as to substance.

LIST (1) FOR GENERAL READING.

Shakespeare's "The Merchant of Venice" and "Julius Cæsar;" Addison's "The Sir Roger de Coverley Papers" in "The Spectator;" Goldsmith's "The Vicar of Wakefield;" Coleridge's "The Rime of the Ancient Mariner;" Scott's "Ivanhoe;" Carlyle's "Essay on Burns;" Tennyson's "The Princess;" Lowell's "The Vision of Sir Launfal;" George Eliot's "Silas Marner."

LIST (2) FOR MINUTE AND CRITICAL STUDY.

Shakespeare's "Macbeth;" Milton's "Lycidas," "Comus," "L'Allegro" and "Il Penseroso;" Burke's "Speech on Conciliation with America;" Macaulay's Essays on Milton and Addison.

Attention is called to the fact that while no examination in grammar or rhetoric, as such, will occur, yet a knowledge of the essential principles of grammar and of the elementary principles of rhetoric is involved in the above requirements. An acquaintance with the general outline of the development of English literature will also be required. Pancoast's Introduction to English Literature and Halleck's History of English Literature are recommended.

2.—MATHEMATICS.

Arithmetic; Algebra, including Quadratic Equations, Proportions, Progressions and Logarithms; Plane Geometry.

In Arithmetic the examination will be on the following subjects: factors and multiples, common and decimal fractions, square root, the more important tables and operations of denominate numbers, percentage and simple interest, compound interest for integral periods only, bank discount, stocks and bonds, and the metric system.

In his preparation in Algebra the candidate should give special attention to factoring, fractional exponents and radicals, and the solution of quadratic equations by factoring and by the formula resulting from the solution of the equation $ax^2+bx+c=o$.

3.—LATIN.

(a) Latin Grammar and Latin Composition (Pearson's "Exercises in Latin Composition," or an equivalent); four books of Cæsar's Gallic War, or Arrowsmith and Whicher's "First Latin Readings" (preferred); six books of Vergil's Æneid; six orations of Cicero; two thousand lines of Ovid, or Sallust's Catiline; the "Roman Method" of pronunciation.

The Grammars of West, Bennett, Lane and Morgan, Harkness (Complete Edition), Allen and Greenough, and Gildersleeve-Lodge are recommended.

(b) Roman History (as in Wolfson), Geography of Roman Empire.

4.—GREEK.

(a) Goodwin's Greek Grammar; Pearson's "Greek Prose Composition," or an equivalent; Xenophon's Anabasis, four books; Homer's Iliad, three books, including Prosody.

(b) Greek History.

(c) The Geography of Ancient Greece.

[The attention of instructors is particularly directed to the student's need of a full and accurate knowledge of the Greek and the Latin Grammar.]

5.—HISTORY OF THE UNITED STATES.

6.—MODERN GEOGRAPHY.

7.—PHYSIOLOGY.

II. PH. B. COURSE

Candidates for admission to the Freshman class in the course leading to the degree of Ph. B. will be examined in the following subjects:

1.—ENGLISH, as for the A. B. Course, page 62.

2.—MATHEMATICS, as for the A. B. Course, page 63.

3.—LATIN, as for the A. B. Course, page 63.

4.—MODERN LANGUAGES.

Either

German.—A knowledge of grammar, comprising declension of nouns, adjectives and pronouns; conjugation of verbs; the rules of syntax and word order; a good facility in correct pronunciation.

Ability to translate at sight a passage of German prose or poetry of ordinary difficulty, and to convert simple English sentences into German. The candidate must have read from 300 to 400 pages of prose and poetry

from various standard authors. Two years' work will ordinarily be necessary to meet this requirement.

Or

French.—A knowledge of grammar, comprising the forms of nouns, adjectives and pronouns; conjugation of verbs; the rules of syntax; the more common idioms; a good facility in correct pronunciation and the ability to write from dictation.

Ability to translate at sight a passage of modern French prose or poetry of ordinary difficulty, and to convert into French simple English sentences founded upon it. The candidate must have read from 300 to 400 pages of prose and poetry from various standard authors. Two years' work will ordinarily be necessary to meet this requirement.

5.—HISTORY OF THE UNITED STATES.

6.—MODERN GEOGRAPHY.

7.—PHYSIOLOGY.

III. B. S. COURSE

Candidates for admission to the Freshman class in the course leading to the degree of B. S. will be examined in the following subjects:

1.—ENGLISH, as for the A. B. Course, page 62.

2.—MATHEMATICS, as for the A. B. Course, page 63.

3.—ADDITIONAL MATHEMATICS.

(a) Solid Geometry.

(b) Plane Trigonometry.

4.—PHYSICS.

An elementary knowledge of Physics, such as may be gained by a year's course of study covering Mechanics, Sound, Heat, Light and Electricity. Preparation should include in-

dividual laboratory work, attested by a note-book, comprising at least thirty-five exercises, chiefly quantitative.

For recitation work, Gage's "Elements of Physics" is recommended as a text-book.

5.—MODERN LANGUAGES, as for the Ph. B. Course, page 64; or Latin, as for the A. B. Course, page 63.

6.—HISTORY OF THE UNITED STATES.

7.—MODERN GEOGRAPHY.

8.—PHYSIOLOGY.

IV., V. and VI. B. E. COURSES

Candidates for admission to the Freshman class in any of the courses leading to the degree of B. E. will be examined in the same subjects that are required for admission to the B. S. Course, page 65.

Requirements for Examination in 1905

IN ENGLISH IN ALL COURSES.

LIST (1) FOR GENERAL READING.

Shakespeare's "The Merchant of Venice" and "Julius Cæsar;" Addison's "The Sir Roger de Coverley Papers" from "The Spectator;" Goldsmith's "The Vicar of Wakefield;" Coleridge's "The Rime of the Ancient Mariner;" Scott's "Ivanhoe;" Carlyle's "Essay on Burns;" Tennyson's "The Princess;" Lowell's "The Vision of Sir Launfal;" George Eliot's "Silas Marner."

LIST (2) FOR MINUTE AND CRITICAL STUDY.

Shakespeare's "Macbeth;" Milton's "Lycidas," "Comus," "L'Allegro," and "Il Penseroso;" Burke's "Speech on Con-

ciliation with America;" Macaulay's Essays on Milton and Addison.

All other requirements as in 1904.

Requirements for Examination in 1906

IN ENGLISH IN ALL COURSES.

LIST (1) FOR GENERAL READING.

Shakespeare's "The Merchant of Venice" and "Macbeth;" Addison's "The Sir Roger de Coverley Papers" from "The Spectator;" Irving's "Life of Goldsmith;" Coleridge's "The Rime of the Ancient Mariner;" Scott's "Ivanhoe" and "The Lady of the Lake;" Tennyson's "Gareth and Lynette," "Lancelot and Elaine," and "The Passing of Arthur;" Lowell's "The Vision of Sir Launfal;" George Eliot's "Silas Marner."

LIST (2) FOR MINUTE AND CRITICAL STUDY.

Shakespeare's "Julius Cæsar;" Milton's "Lycidas," "Comus," "L'Allegro" and "Il Penseroso;" Burke's "Speech on Conciliation with America;" Macaulay's Essays on Addison and Johnson.

All other requirements as in 1904.

ENTRANCE EXAMINATIONS

1904

THURSDAY, FRIDAY, JUNE 9, 10.

TUESDAY, WEDNESDAY, THURSDAY, SEPTEMBER 13-15.

Candidates will present their credentials at the office of the President at 2 P. M. on Monday, Sept. 12, and register for examination.

Only those who register at the appointed time will be admitted to the examinations of the following days.

SCHEDULE OF EXAMINATIONS

First day, Spring; Second day, Fall.

9 A. M. Physics. Physiology.	11 A. M. Algebra.	2 P. M. U. S. History 3 P. M. English.

Second day, Spring; Third day, Fall.

9 A. M. Latin. Solid Geometry.	11 A. M. German. French.	2 P. M. Greek. Plane Geometry. Plane Trigonometry.

DEPARTMENTS OF INSTRUCTION

The Greek Language and Literature

PROFESSOR BENNETT.

FRESHMAN YEAR.

1. **Xenophon:** The *Memorabilia of Socrates.* **Plato:** The *Apology,* the *Crito,* and parts of the *Phaedo.* Botsford's *History of Greece.* Tozer's *Classical Geography.* Mahaffy's *Old Greek Life.* Jebb's *Greek Literature.* Bullfinch's *Age of Fable.* Four hours weekly. *Required in the A. B. course.*

SOPHOMORE YEAR.

2. **Homer:** Selected books of the *Odyssey.* **Herodotus:** Merry's *Selections.* **Greek Testament:** *The Acts of the Apostles; The Gospel According to St. Mark.* Jebb's *Introduction to Homer.* Mahaffy's *Survey of Greek Civilization.* Tarbell's *History of Greek Art.* Three hours weekly. *Required in the A. B. course.*

JUNIOR YEAR.

3. **The Attic Orators:** Jebb's *Selections.* Demosthenes' *De Corona.* Jebb's *Attic Orators from Antiphon to Isaeus.* Dickinson's *Greek View of Life.* Two hours weekly. *Elective.*

SENIOR YEAR.

4. **The History of Ancient Greek Poetry:** Wright and Abbot's *Golden Treasury of Ancient Greek Poetry.* Jebb's *Classical Greek Poetry.* Haigh's *Tragic Drama of the Greeks.* Butcher's *Some Aspects of Greek Genius.* Two hours weekly. *Elective.*

5. **Pausanias:** The *Periegesis;* Greek text and Frazer's commentary. Thesis. Two hours weekly. *Courses* 3, 4 *and* 5 *are required of candidates for special honors in Greek.*

The Latin Language and Literature

PROFESSOR ASHMORE.

The Freshman and Sophomore studies in this department are prescribed in the A. B. and Ph. B. courses. The Junior and Senior courses are elective. The following programme is intended to indicate the general scope of the work of the four classes. Equivalents may be substituted at the discretion of the head of the department.

FRESHMAN YEAR.

1. **Cicero:** Cato Maior. **Livy:** Books XXI, XXII. **Latin Composition:** Four hours weekly.

SOPHOMORE YEAR.

2. **Horace:** Odes and Epodes. **Terence:** Adelphoe. **Plautus:** Captivi or Mostellaria. Three hours weekly.

JUNIOR YEAR.

3. **Horace:** Satires and Epistles. Two hours weekly. First term.
4. **Juvenal** (Principal Satires) **and Lectures on the Private Life of the Romans.** Two hours weekly. Second term.
5. **Tacitus.** Two hours weekly. Third term.

SENIOR YEAR.

6. **Gudeman's Selections from the Literature of the Empire.** Two hours weekly. First term.
7. **Selections from Catullus and Lucretius.** Two hours weekly. Second term.
8. **Lectures on the Monuments and Topography of Ancient Rome.** Two hours weekly. Third term.

SPECIAL HONORS.

Candidates must elect all the courses of the Junior and Senior years, and write a thesis of prescribed length on some topic closely related to their Latin studies.

Modern Languages

ASSISTANT PROFESSOR MARCH AND INSTRUCTORS KRAUSE AND VAN LOON.

The study of modern languages is required of all students. A reliable practical knowledge is the first result aimed at in the elementary courses, but as soon as possible the literary side of language is brought to the front, and good books are read for what they contain. The advanced courses vary somewhat from year to year, according to the judgment and preference of the instructors, and the ability and character of the students composing the classes.

1. **Elementary German.** Required. Three terms, three hours a week. Freshman year. Ph. B., B. S., B. E.

1a. **Elementary German.** Required. Three terms, three hours a week. Sophomore year. A. B.

2. **Elementary French.** Required. Three terms, three hours a week. Freshman year. All courses.

3. **Elementary Spanish.** Elective. Three terms, three hours a week. Senior year. A. B., Ph. B., B. S.

4. **Intermediate German.** Required. Three terms, three hours a week. Freshman year. Ph. B., B. S., B. E. This course is devoted to selected works of both the classical and the later periods.

4a. **Intermediate German.** Required. Three terms, three hours a week. Sophomore year. Ph. B., B. S. Like course 4.

4b. **Intermediate German.** Required. The first two terms, three and two hours, respectively, a week. Junior year. A. B. Like course 4.

5. **Intermediate French.** Required. Three terms, three hours a week. Freshman year. Ph. B., B. S., B. E. Corresponds to course 4.

5a. **Intermediate French.** Required. Three terms, three hours a week. Sophomore year. Ph. B., B. S. As in 5.

6. **Advanced German.** Elective. Three terms, three hours a week. Junior year. A. B., Ph. B., B. S. This course is devoted to the rapid reading of modern German authors.

7. **Advanced French.** Elective. Three terms, three hours a week. Junior year. A. B., Ph. B., B. S. Corresponds to course 6.
8. **Advanced German.** Elective. Three terms, two hours a week. Senior year. A. B., Ph. B., B. S. Is devoted to a careful study of some works of the classic period, but in any year may be made a continuation of 6.
9. **Advanced French.** Elective. Three terms, two hours a week. Senior year. A. B., Ph. B., B. S. Like 8, is devoted to a few works of some special period, not contemporary, but may be made a continuation of 7.

More advanced courses, leading to special honors in French and German, are offered for those students who are qualified to pursue them.

English

PROFESSOR HALE.

I. RHETORIC AND COMPOSITION.

1. **Freshman Rhetoric.** In the first term a summary review of diction is given. In the second and third terms more attention is given to the development of thought by work upon kinds of composition and the paragraph. Throughout the Freshman year. Two hours weekly.
2. **Sophomore Rhetoric.** A continuation of course 1. Fall term Sophomore in the A. B., Ph. B. and B. S. courses. Two hours.
3. **Sophomore Rhetoric.** Practical work in essays and orations. First term in the Engineering course, and second and third terms in all courses. One hour.
4. **Argumentation and Debate.** The course gives a good deal of practice in oral debate and the outlines of the theory of argumentation. Two hours. For Juniors.
5. **Junior Rhetoric.** Practical work in essays and orations. Throughout the year, for all courses. One hour.

6. **Senior Rhetoric.** Practical work in essays and orations. Throughout the year, for all courses, except third term in the Engineering course. One hour.

II. THE ENGLISH LANGUAGE AND LITERATURE.

1. **Old and Middle English.** The course will include the study of Anglo-Saxon, a more cursory reading of Middle English, and a course of lectures on Historical Grammar. Throughout the Junior year. Two hours.
2. **Sophomore English.** Shakespeare; a reading of several plays and a study of the Elizabethan Theatre. Second and third terms in the A. B., Ph. B. and B. S. courses. Three and two hours, respectively.
3. **Sophomore English** for Engineers. This course includes a study of Shakespeare's "Hamlet," and of Bacon's Essays. First and second terms. Three and two hours, respectively.
4. **Junior English.** The three terms will be given to a study, respectively, of the Essay, the Novel, the Oration. Throughout the year. Three hours the first term, and two hours the second and third terms.
5. **Senior English.** An introduction to the critical study of poetry. Throughout the year. Two hours.

History and Sociology

PROFESSOR RIPTON.

The work of the department covers three years, beginning with the first term of the Sophomore year. It is designed to give such a general knowledge of History, Economics and Sociology as belongs to a liberal education. At the same time sufficient work is offered in the electives to prepare those students who desire to take up graduate work in these subjects. The instruction is given by text-book, by lectures, and by library references, the students reporting the results of their reading partly during the regular work of the class, and partly in the form of essays. The subjects covered by the courses are in detail as follows:

1. **English History.** The narrative history of England is taught chiefly, but considerable time is devoted to the industrial, commercial and social history of the country, and to the development of the English Constitution. The importance of collateral readings from the English authorities is emphasized. First and second terms Sophomore. Two hours a week. *Required.*

2. **French History.** Beginning with a brief study of Roman Gaul, the main purpose is to show the growth of the French nation and the working of the different forces which promoted or retarded French unity. The period studied concludes with the year 1789. The history of France from that date to the present is taken up in greater detail in Course 5. Third term Sophomore. Two hours a week. *Required.*

3. **Middle Ages, Renaissance and Reformation.** The broad outlines of the history of Europe from the beginning of the Christian Era to the Peace of Westphalia, 1648, are considered. Particular attention is given to the study of the mediæval institutions. First, second and third terms Junior. Two hours a week. *Elective.* (Not given in 1903-4.)

4. **American History.** A study is made of the period of American discovery and exploration and of the colonial period. The main part of the work, however, begins with an examination of the causes of the American Revolution. The course is guided by text-books and lectures, and much work is done in the library among the sources and authorities. First, second and third terms Junior and Senior. Three hours a week. *Elective.*

5. **French Revolution and Nineteenth Century.** This course considers the causes, ideas and progress of the French Revolution, and the reconstruction of European politics and society produced by the revolutionary and Napoleonic wars. It then takes up an examination of the events and forces which contributed to the unification of Italy and of Germany, and concludes with a brief study of the Eastern Question. The course is designed to give a clear understanding of political affairs as they exist in Europe to-day and the historical processes by

which they were brought about. First, second and third terms Senior. Three hours a week. *Elective.*

6. **Comparative Politics.** A study is made of the state and national systems of the American Government, together with the general duties and powers of the legislative, executive and judicial branches of the same. A comparative study is then made of the principal governments of Europe, with reference especially to the provisions of their present constitutions and the way in which those constitutions have developed and may be amended. The course is completed by a study of International Law, with reference especially to origin and development. First, second and third terms Senior. Three hours a week. *Elective.*

   In 1903-4 courses 5 and 6 are combined in one five-hour course.

7. **Economics.** It is the design of this course to give instruction in the leading principles of Economics. While a textbook is used in order to secure more rapid progress, still the views of no school are taught exclusively. By lectures and required collateral reading an attempt is made to present the results of the latest and most approved investigations in the science. The course closes with a series of lectures upon the history of Political Economy. First term Senior. Three hours a week. *Required in all courses.*

8. **Sociology.** In this course the mutual relations of men in society are examined historically, that the student may learn how present conditions have resulted from past experience. Present social forces and needs are considered, with the purpose of training the students to fulfill the demands of good citizenship. The collateral reading and practical sociological investigation is guided throughout the course by lectures. Second and third terms Senior. Three hours a week. *Required in all except Engineering courses.*

Mental and Moral Philosophy

PROFESSOR HOFFMAN.

The course in Philosophy begins with the second term Junior and extends through the entire Senior year. Experimental Psychology and Elementary Ethics, the former coming the second and the latter the third term of the Junior year, are required. All the other courses are elective. Instruction in the various studies of the department is usually given by means of lectures, discussions and the use of a text-book.

The course in Experimental Psychology is designed to acquaint the student with the most obvious facts of his mental experience. The chief problems discussed are sensation, localization of functions, memory, conception, the emotions and the will; as far as possible the positions taken up are illustrated and confirmed by actual experiments. The facts of Pathological Psychology are also here briefly considered, especially such abnormal forms of consciousness as aphasia, hypnotism, double personality and insanity.

As Elementary Ethics is a required study, only the outlines of the subject are presented in this course. The history of ethical theories is first briefly reviewed, and then the present aspects of the subjects are discussed. The relation of Ethics to other sciences is pointed out, and much attention is given to the ethical problems involved in such questions as taxation, transportation, corporations, the treatment of criminals, the care of the poor, and the formation and dissolution of the family.

The study of the History of Philosophy begins with the first term Senior year and comes three hours a week for three successive terms. The object of the course is to go over with considerable detail the general field of Philosophy, from the earliest times down to our own day, and to present for consideration and discussion the views of the great thinkers of the world upon the validity of knowledge, the existence of God, the nature of virtue, the foundation of the State and other problems of similar import. Much is made of the historical connection of the different systems for the purpose of impressing upon the mind of the student the successive steps that have been taken in the actual development of thought.

Courses in Advanced Psychology and Advanced Ethics are offered to the Seniors during the first and second terms, respectively, in which the higher problems suggested in the elementary courses receive more extended treatment.

During the third term Senior the principal studies of this department are: Political and Social Philosophy and the Evolution of Religion. Under this last head the chief ideas of the leading religions of the heathen world are critically examined, their excellences and defects pointed out and a comparison made of them with the special doctrines of the Christian system.

Mathematics

PROFESSOR WRIGHT AND MR. GARIS.

1. **Solid and Spherical Geometry.** *Wentworth's Geometry.* Required of Freshmen in the A. B. and Ph. B. courses.

2a. **Algebra.** *Wells' College Algebra. Hall and Knight's Algebra.* Freshman required.

2b. **Algebra.** The Theory of Equations, including the elements of Determinants. Open only to those who have taken 5a. Junior elective.

3a. **Plane and Spherical Trigonometry.** *Wentworth.* Freshman required.

3b. **Advanced Trigonometry.** *Loney's Trigonometry, Part II.* Junior elective.

4a. **Analytic Geometry.** *Nichol's Analytic Geometry.* Freshman and Sophomore required.

4b. **Analytic Geometry, advanced course.** *C. Smith's Conic Sections.* Junior and Senior elective. Open only to those who have taken 2b.

4c. **Solid Analytic Geometry.** *C. Smith's Solid Geometry.* Junior and Senior elective. Open only to those who have taken 4b.

5a. **Differential and Integral Calculus.** *Hall's Calculus.* Required of Sophomores in the B. S. course. Junior and Senior, elective to others.

5b. **Calculus, advanced course.** *Greenhill or Lamb.* Senior elective. Open only to those who have taken 4b and 5a.

6. **Differential Equations.** *Murray.* Senior elective. Open only to those who have taken 5b.

Candidates for special honors in Mathematics may take course 4b, 4c, 5b or 6.

Mechanics and Physics

PROFESSOR OPDYKE.

The subjects treated in the work of this department are Mechanics, Sound, Heat, Light and Electricity. A short course in Astronomy is also given.

In the A. B. and the Ph. B. courses the required work extends through the three terms of Junior year, and consists of lectures and recitations. This is followed by an elective course in Laboratory work during the Senior year.

In the B. S. and the B. E. courses the required work extends through the six terms of Freshman and Sophomore years. During Freshman year the work consists of lectures, illustrated by means of an extensive collection of physical apparatus; during Sophomore year, of lectures, recitations and laboratory practice. This is followed by an elective course in Mathematical Physics, open to Juniors and Seniors.

The courses, in more detail, are these:

1. **Experimental Physics a.** A. B. and Ph. B. courses. Four hours per week first term, three hours second and third terms. Junior year. Lectures and recitations. Ames's *Theory of Physics.*

2. **Experimental Physics b.** B. S. and B. E. courses. Two hours per week during the Freshman year. Lectures.

3. **Mechanics and General Physics.** B. S. and B. E. courses. Five hours per week throughout the Sophomore year. Lec-

tures, recitations and laboratory practice. Wright's *Mechanics;* Hastings and Beach's *General Physics;* Sabine's, Ames and Bliss's, and Nichol's *Laboratory Manuals.*

4. **Elective in Laboratory Work.** A. B. and Ph. B. courses. Two hours per week during the year. Open to Seniors who have taken 1.

5. **Elective in Mathematical Physics.** B. S. and B. E. courses. Two hours per week during the year. Lectures, recitations and special reading. Open to those who have taken 2 and 3. (Not given in 1903-4.)

6. **Astronomy.** Three hours per week. B. S. course second term Sophomore, B. E. course second term Junior year. Young's *Manual of Astronomy.*

Chemistry

ASSISTANT PROFESSOR CURTISS.

The chief aim of the instruction in this department is to give the student a sound training in the modern methods of pure science, and to develop thereby accurate observation, logical reasoning, and the power of forming correct judgments on observed facts. The courses are intended quite as much as a liberal culture training as for the practical use that may afterward be made of the knowledge gained. The student desiring to specialize in Chemistry, or to take up the study of Medicine, Biology, Geology, or other branches of Natural Science, will find the courses, and the exact training required, of the greatest value.

1. **General Chemistry.** Three hours a week for one year. Recitations, lectures and two hours in the laboratory. In this course the student studies the commoner elements and their compounds, and the fundamental laws and theories connected with the science. The subject matter of the recitations is illustrated by charts, and by experimental lectures, the student repeating as many of the experiments as is practicable the same day, in the laboratory, being taught to observe carefully, reason out his own results, and to keep careful, accu-

rate notes of all work performed. Required of all except candidates for the A. B. degree, and elective with them in Junior and Senior years. Text-books: Remsen's *Introduction to the Study of Chemistry, Briefer Course.* Remsen's *Chemical Experiments, The Advanced Course,* by the same author, is recommended for collateral reading.

1a. **General Chemistry.*** Two hours a week of laboratory work, to be taken only in conjunction with Course 1, and intended for students who wish to go more deeply into the subject.

1b. **General Chemistry.** This is a two-hour lecture course through the year, for Engineers of the Freshman class, and consists of a discussion, with experimental demonstrations, of the fundamental laws and facts of Chemistry.

2. **Qualitative Analysis.*** This course consists of six hours per week, for one year, in the laboratory, in connection with quizzes and informal lectures given usually in the laboratory. In this work the student familiarizes himself further with the more important elements, their compounds and reactions. The knowledge thus gained is classified and systematized, the elements separated into groups, and eventually each member of these groups is separated and identified by appropriate tests. The worker is thus led on from a study of known substances to complex mixtures of unknown composition, where the knowledge first gained of chemical properties and reactions is practically tested. No new work is allowed to be taken up until a successful result, proved to be correct, is obtained. Text-books: Dennis and Whittlesey's *Laboratory Guide in Qualitative Analysis,* and Fresenius' *Qualitative Analysis;* Remsen's *Inorganic Chemistry, Advanced Course,* for reference. Course 2 elective after Course 1.

2a. **Qualitative Analysis.** Required of Civil and Sanitary Engineers. This course consists of six hours per week in the laboratory, with recitations, during the Fall term. Its aim is to give the student a general idea of the theory and methods employed in qualitative analytical work and such a practical knowledge of some of the more important metals and their

reaction as may be possible in the limited time allowed. This course may serve as a basis for a more detailed study of the subject as opportunity presents itself later to the student.

3. **Quantitative Analysis.*** This course consists of six hours per week, for one year, in the laboratory, as in 2. The student studies systematically the various gravimetric and volumetric methods of analysis, first of simple, then of complex chemical compounds, mineral substances, natural products, etc., etc. A thorough course in Elementary Organic Analysis is also included. Course 3 is elective after 1 and 2. This course is especially valuable in training one in that art of delicate manipulation so essential to success in many departments of scientific work.

4. **Organic Chemistry.*** Three hours a week for one year. Recitations and illustrated lectures. A systematic study of the more important typical members of the Fatty and Aromatic Series, with reference to their occurrence in nature and their economic uses. A thorough exposition of the fundamental principles and most recent theories of Organic Chemistry is included. Elective after Course 2. Text-books: A. Bernthsen's *Organic Chemistry*. Other more extensive works will be assigned for reference.

5. **Organic Chemistry.*** Three or six hours a week in the laboratory. Here a study of the methods of making typical organic compounds is undertaken, as well as the means employed to purify and test them. This course is preparatory to research work in Organic Chemistry. Open as an elective after, or in conjunction with, Course 4.

*Courses marked with a star are not required, and will be given in the coming year only in case laboratory facilities are available after arrangements are completed in the Fall for required courses 1, 1b and 2a.

Biology and Geology

PROFESSOR STOLLER.

1. **General Biology a.** This course is intended to give the student a knowledge of living plants and animals and to afford mental training in the study of nature. The work begins with the study of protoplasm, cells, tissues and organs, as parts common to plants and animals; then a series of types, first of animals, and afterward of plants, is carefully studied on the basis of morphology, physiology and development. Recitations and laboratory work, counting as five hours in the first term and three in the second and third terms. Required of Juniors in the B. S. course.

2. **General Biology b.** In this course, as in the preceding, the observational study of a series of types is made the basis of the work, but less time is given to laboratory technique, the main purpose being to afford the student a grasp of the broader facts and principles of biological science in their general philosophical relations. Recitations and laboratory work counting as three hours in the first term, two hours in the second and three hours in the third term. Required of Juniors in the Ph. B. course.

3. **General Principles of Zoology.** The aim of this course is to use the data of zoology for their worth as contributing to liberal culture. The more general facts and principles of animal structure, function and development are reviewed and considered in their relation to the study of man. The scientific evidences of organic evolution and the theories of evolution of various authors are considered. Recitations and lectures, three hours per week, third term. Required of Juniors in the A. B. course.

4. **Animal Morphology.** This course is adapted for students who wish a somewhat advanced knowledge and training in biology, especially as a preparation for teaching or for the medical profession. The work is mainly in the line of comparative anatomy, and includes the dissection of several vertebrate types in detail. Some time is given to elementary

histology and embryology, involving the technique of section-cutting, etc. The course includes the reading of texts in general zoology and embryology. Three hours (six hours of laboratory work) per week throughout the year. Elective to Seniors.

5. **Bacteriology.** Students who have elected Course 4 may be permitted to take, in the third term, elementary practical bacteriology in place of a part of the anatomical work.

6. **Mineralogy and Geology.** This course consists of laboratory work in determining the common minerals and rocks and of an introduction to the study of rock-strata and their classification. Three hours a week, third Sophomore term. Required of Sophomores in the B. S. course.

7. **General Geology.** The instruction in this course is adapted primarily to the study of the science as a branch of liberal culture, but enough practical work is included to afford a foundation for special study or for teaching. The work begins with the examination of the more common minerals and rocks, and passes to the study of structural geology, a number of field excursions being made. The principles of dynamic geology are then considered, after which the time is given to systematic geology and paleontology. In the third term the work is field work, supplemented by reading. The geological formations readily accessible from Schenectady are inspected, fossils are collected and readings from the State geological reports are made. Three hours a week throughout the year. Elective to Juniors and Seniors. Until further notice, this course will be given on alternate years. It will not be given in the year 1904-5.

8. **Economic Geology.** In this course, after a brief study of the principles of dynamic and structural geology, the work is related to the occurrence and distribution in the United States of building stones, mineral ores, coal and other economic products. Recitations, lectures and some laboratory work, two hours a week, first Senior term. Required of engineering students.

Physiology and Physical Education

DR. TOWNE.

Human Anatomy, Physiology, Hygiene and Physical Education are required in all courses. In the Freshman year the work consists of recitations, demonstrated by means of the manikin and the human skeleton. A thorough study of the human body is made, so that the student is more able to understand the benefits resulting from systematic bodily exercise.

The course in the gymnasium is so arranged as to give a practical knowledge of the different apparatus pertaining to physical training. Commencing with light work, consisting of free gymnastics, club, dumb-bell and wand exercises, the course leads through a graded series, involving heavier work as the student becomes fitted for it.

At the beginning of the second year Hygiene is taken up, the aim being to give a course which is practical. With this end in view, certain lectures are also given, in connection with the subject, on "First Aid to the Injured."

It is the aim of the department to give the student such a training in the methods of Physical Education that he may have a comprehensive knowledge of the subject, and to secure health, vigor and such harmonious development of the body as will fit it to resist disease, and prepare it for efficient service, both now and later in life.

A thorough physical examination of each student is made in the fall, and the measurements are outlined on charts, so as to show the parts below the normal development, for which special exercises suited to the health and physical condition of each individual are prescribed.

In connection with the college is a gymnasium, equipped with new apparatus and adapted to the purposes of providing excellent opportunities for physical training. It is open from 7 A. M. to 6 P. M. during the college year to all classes for voluntary work. All kinds of athletic sports are encouraged, as much as possible, under the advice and guidance of the department.

LECTURES

It is the policy of the college to provide its students with the advantages of frequent lectures by specialists in the various departments of knowledge.

THE LIBRARY

The library is open every week day from 8 A. M. to 12:30 P. M., from 2 P. M. to 6 P. M., and from 7 P. M. to 9 P. M. It now occupies Nott Memorial Hall, a building centrally located and admirably adapted to library purposes. Among the special collections are the excellent engineering and scientific library of the late Professor Gillespie, the collection of mathematical works made by the late John Patterson, of Albany, and the library of the late Hon. Henry J. Cullen, of the class of 1860. The income from a bequest of five thousand dollars left by the late Lemon Thomson, Esq., of Albany, of the class of 1850, is devoted to the purchase of books on American subjects, especially history and political science. An alcove, known as the "Thomson Alcove," is reserved for these books. By the will of the late Rev. Oscar Blakeslee Hitchcock, of the class of 1852, a bequest of upwards of thirty thousand dollars was left to the college for the purchase of books, manuscripts, etc. The librarian and his assistants are always ready to aid the student in his study and investigation, and to furnish information regarding the direct personal use of indexes, catalogues and other library means.

In the periodical reading room of the library will be found the current issues of about seventy-five of the most important magazines, reviews, periodicals and newspapers, both American and foreign, as well as the transactions of a number of the learned societies and organizations.

Any student is allowed to withdraw books from the library upon making a deposit of five dollars, which can be taken up at any time.

THE NATURAL HISTORY MUSEUM

PROFESSOR STOLLER, CURATOR.

It is expected that during the current year the main body of the cellections will be transferred to the third floor of Nott Memorial Hall. The opportunity will be used, as far as possible, to rearrange them, and to set them in order with reference to their preservation and their educational use.

In zoology, the collection of mounted birds numbers 311 specimens, representing 161 species of the bird fauna of the Eastern United States. These have recently been carefully inspected, and will be reclassified and labelled. Of mammals there is a collection of 57 skins, the gift of the U. S. National Museum, and a number of skulls, skeletons and mounted specimens. Fishes, amphibia and reptiles, especially of the local fauna, are represented by specimens in alcohol. In the department of invertebrates the collections of marine animals made by Dr. Harrison E. Webster are extensive, including sponges, corals, worms, crustacea and mollusks, the total number of species represented being over 5,000. The Wheatley collection of shells, presented by E. C. Delavan, Esq., consists of 8,000 specimens. The botanical collections include a nearly complete set of local flowering plants, the work of Professor Jonathan Pearson. To this there has since been added a complete set of the ferns and fern allies of Schenectady County. The flora of the United States is further represented by collections from Virginia, the Red River region of the Southwest, and those made by Dr. Nevins in Alabama. The lower cryptograms are represented by a valuable collection of 2,300 specimens of fungi, the gift of Mr. J. B. Ellis, of the class of 1851. The Herbarium also includes a considerable number of foreign plants, including representative collections from Germany, Spain, Asia Minor and England, as well as some specimens from Iceland, Norway, France and Switzerland. They have been sorted and distributed in a single series following the latest accepted sequence, that of Engler and Prantl's "Natürliche Pflanzenfamilien," making the entire collection of some 8,000 or 10,000 specimens readily accessible for reference and study.

In Mineralogy, the Wheatley collection of minerals given by E. C. Delavan, Esq., which is labeled according to the system of Dana, contains 4,000 specimens, many of which represent the more valuable forms.

In Geology there is a general collection of rocks and minerals, comprising some 3,000 specimens; and a considerable collection of Paleozoic and Mesozoic fossils. The collections made by the geological department under the direction of Professor C. S. Prosser so increased the museum that there is plenty of material now available, especially, for the careful study of the Paleozoic rocks and fossils of the New York formations.

Recently there has been added the educational series of rock specimens, the gift of the United States Geological Survey.

ORDER AND PROPORTION

OF STUDIES

FOR THE YEAR 1903-1904

A. B. COURSE.

FRESHMAN YEAR

First Term.

Hours per week.

4 Greek.
4 Latin.
3 French.
2 Rhetoric.
4 Solid Geometry.
1 Physiology.
Greek Prose Composition.
Latin Prose Composition.

Second Term.

4 Greek.
4 Latin.
3 French.
2 Rhetoric.
4 Algebra.
1 Physiology.
1 Gymnastics.
Greek Prose Composition.
Latin Prose Composition.

Third Term.

4 Greek.
4 Latin.
3 French.
2 Rhetoric.
3 Trigonometry.
1 Physiology.
1 Gymnastics.
Greek Prose Composition.
Latin Prose Composition.

A. B. COURSE.

SOPHOMORE YEAR

First Term.

Hours per week.

3 Greek.
3 Latin.
3 German.
2 Rhetoric.
2 History.
3 Analytic Geometry.
1 Hygiene.

Second Term.

3 Greek.
3 Latin.
3 German.
3 English Literature.
1 Rhetoric.
2 Logic.
2 History.

Third Term.

3 Greek.
3 Latin.
3 German.
2 English Literature.
1 Rhetoric.
2 Logic.
2 History.

A. B. COURSE.

JUNIOR YEAR

First Term.

Hours per week

It is the custom of the student body to levy an annual campus tax of ten dollars, five dollars of which is payable at the beginning of the fall term, three dollars at the beginning of the winter term, and two dollars at the beginning of the spring term. This money is used for the support of the different branches of athletics consisting at present of foot ball, base ball, basket ball and track.

5 Physics.
3 Biology.
7 Elective.*

*For list of Electives, see pages 103, 104.

A. B. COURSE.

SOPHOMORE YEAR

First Term.

Hours per week.

3 Greek.
3 Latin.
3 German.
2 English Literature.
1 Rhetoric.
2 Logic.
2 History.

A. B. COURSE.

JUNIOR YEAR

First Term.

Hours per week.

3 German.
3 English Literature.
1 Rhetoric.
4 Mechanics.
7 Elective.*

Second Term.

2 German.
2 English Literature.
1 Rhetoric.
3 Psychology.
3 Physics.
7 Elective.*

Third Term.

1 Rhetoric.
3 Ethics.
3 Physics.
3 Biology.
7 Elective.*

*For list of Electives, see pages 103, 104.

A. B. COURSE.

SENIOR YEAR

First Term.

Hours per week.

1 Rhetoric.
3 Economics.
13 Elective.*

Second Term.

1 Rhetoric.
3 Sociology.
13 Elective.*

Third Term.

1 Rhetoric.
3 Sociology.
13 Elective.*

*For list of Electives, see pages 104-106.

PH. B. COURSE.

FRESHMAN YEAR

First Term.

Hours per week.

4 Latin.
3 German.
3 French.
2 Rhetoric.
4 Solid Geometry.
1 Physiology.
Latin Prose Composition.

Second Term.

4 Latin.
3 German.
3 French.
2 Rhetoric.
4 Algebra.
1 Physiology.
1 Gymnastics.
Latin Prose Composition.

Third Term.

4 Latin.
3 German.
3 French.
2 Rhetoric.
3 Trigonometry.
1 Physiology.
1 Gymnastics.

PH. B. COURSE.

SOPHOMORE YEAR

First Term.

Hours per week.

3 Latin.
3 German or French.
2 Rhetoric.
2 History.
3 Analytic Geometry.
3 Chemistry.
1 Hygiene.

Second Term.

3 Latin.
3 German or French.
3 English Literature.
1 Rhetoric.
2 Logic.
2 History.
3 Chemistry.

Third Term.

3 Latin.
3 German or French.
2 English Literature.
1 Rhetoric.
2 Logic.
2 History.
3 Chemistry.

PH. B. COURSE.

JUNIOR YEAR

First Term.

Hours per week.

3 English Literature.
1 Rhetoric.
4 Mechanics.
3 Biology.
7 Elective.*

Second Term.

2 English Literature.
1 Rhetoric.
3 Psychology.
3 Physics.
2 Biology.
7 Elective.*

Third Term.

1 Rhetoric.
3 Ethics.
3 Physics.
3 Biology.
7 Elective.*

*For list of Electives, see pages 103, 104.

PH. B. COURSE.

SENIOR YEAR

First Term.

Hours per week.

1 Rhetoric.
3 Economics.
13 Elective.*

Second Term.

1 Rhetoric.
3 Sociology.
13 Elective.*

Third Term.

1 Rhetoric.
3 Sociology.
13 Elective.*

*For list of Electives, see pages 104-106.

B. S. COURSE.

FRESHMAN YEAR

First Term.

Hours per week.

3 French.
3 German.
2 Rhetoric.
4 Algebra.
3 Chemistry.
1 Physiology.

Second Term.

3 French.
3 German.
2 Rhetoric.
3 Analytic Geometry.
3 Chemistry.
1 Physiology.
1 Gymnastics.

Third Term.

3 French.
3 German.
2 Rhetoric.
3 Analytic Geometry.
3 Chemistry.
1 Physiology.
1 Gymnastics.

B. S. COURSE.

SOPHOMORE YEAR

First Term.

Hours per week.

3 German or French.
2 Rhetoric.
2 History.
5 Calculus.
5 Mechanics and Physics.
1 Hygiene.

Second Term.

3 German or French.
3 English Literature.
1 Rhetoric.
2 Logic.
2 History.
5 Mechanics and Physics.
3 Spher. Trig. and Astronomy.

Third Term.

3 German or French.
2 English Literature.
1 Rhetoric.
2 Logic.
2 History.
5 Physics.
3 Mineralogy and Geology.

B. S. COURSE.

JUNIOR YEAR

First Term.

Hours per week.

3 English Literature.
1 Rhetoric.
5 Biology.
8 Elective.*

Second Term.

2 English Literature.
1 Rhetoric.
3 Psychology.
3 Biology.
8 Elective.*

Third Term.

2 English Literature.
1 Rhetoric.
3 Ethics.
3 Biology.
8 Elective.*

*For list of Electives, see pages 103, 104.

B. S. COURSE.

SENIOR YEAR

First Term.

Hours per week.

1 Rhetoric.
3 Economics.
13 Elective.*

Second Term.

1 Rhetoric.
3 Sociology.
13 Elective.*

Third Term.

1 Rhetoric.
3 Sociology.
13 Elective.*

*For list of Electives, see pages 104-106.

GENERAL LIST OF ELECTIVES.

[For limiting conditions, see statements of respective departments.]

JUNIOR YEAR

First Term.

Hours per week.

2 Greek.
2 Latin.
3 German.
3 French.
2 Anglo-Saxon.
2 Advanced Rhetoric—Argumentation.
3 American History.
2 European History.
2 Theory of Equations, or Calculus.
2 Mathematical Physics.
3 General Chemistry. (For A. B. Course.)
3 Qualitative Analysis (2).
3 Quantitative Analysis (3).
3 General Geology.

Second Term.

2 Greek.
2 Latin.
3 German.
3 French.
2 Anglo-Saxon.
2 Advanced Rhetoric—Argumentation.
3 American History.
2 European History.
2 Advanced Trigonometry, or Calculus.
2 Mathematical Physics.
3 General Chemistry. (For A. B. Course.)
3 Qualitative Analysis (2).
3 Quantitative Analysis (3).
3 General Geology.

Third Term.

2 Greek.
2 Latin.
3 German.
3 French.
2 Anglo-Saxon.
2 Advanced Rhetoric—Argumentation.
3 American History.
2 European History.
2 Mathematical Physics.
3 General Chemistry. (For A. B. Course.)
3 Qualitative Analysis (2).
3 Quantitative Analysis (3).
3 General Geology.

GENERAL LIST OF ELECTIVES.

[For limiting conditions, see statements of respective departments.]

SENIOR YEAR

First Term.

Hours per week.

2 Greek.
2 Latin.
3 Spanish.
2 German or French.
2 English Poetry.
3 Comparative Politics.
3 European History.
3 History of Philosophy.
3 Advanced Psychology.
2 Advanced Calculus.
2 Mathematical Physics.
2 Physical Laboratory.
3 General Chemistry (1).
3 Qualitative Analysis (2).
3 Quantitative Analysis (3).
3 General Geology.
3 Invertebrate Morphology.

GENERAL LIST OF ELECTIVES.

[For limiting conditions, see statements of respective departments.]

SENIOR YEAR

Second Term.

Hours per week.

2 Greek.
2 Latin.
3 Spanish.
2 German or French.
2 English Poetry.
3 Comparative Politics.
3 European History.
3 History of Philosophy.
3 Advanced Ethics.
2 Advanced Calculus.
2 Mathematical Physics.
2 Physical Laboratory.
3 General Chemistry (1).
3 Qualitative Analysis (2).
3 Quantitative Analysis (3).
3 General Geology.
3 Vertebrate Anatomy.

GENERAL LIST OF ELECTIVES.

[For limiting conditions, see statements of respective departments.]

SENIOR YEAR

Third Term.

Hours per week.

2 Greek.
2 Latin.
3 Spanish.
2 German or French.
2 English Poetry.
3 European History.
3 International Law.
3 Evolution of Religion.
3 History of Philosophy.
2 Differential Equations.
2 Mathematical Physics.
2 Physical Laboratory.
3 General Chemistry (1).
3 Qualitative Analysis (2).
3 Quantitative Analysis (3).
3 General Geology.
3 Comparative Vertebrate Anatomy.

THE CURRICULUM OF THE B. E. COURSES

See pages 157-169.

GENERAL REGULATIONS

Registration.—Every student must report at the Registrar's office at the beginning of each term and register college or local residence. Any change of residence during the term must be reported at once, in conformity with the regulation made by the Treasurer's office.

Residence.—Students are not allowed to change their college rooms during the term without permission of the Treasurer; for every change the sum of two dollars is charged. Students must conform to college rules regarding keys.

Reports.—A daily record of attendance at class and chapel and of scholarship is kept, and is transmitted at the close of each term, or more frequently, to the student's parent or guardian.

Standing.—There are four grades of scholarship:—from 9 to 10 inclusive, first grade; from 8 to 8.9, second grade; from 7 to 7.9, third grade; from 6 to 6.9, fourth grade. A student who receives a mark of 4 to 5.9 is reported as conditioned; below 4, as failed. In the mathematical studies of the engineering course the sustaining mark is 7, and any mark below 5 indicates failure.

A student who is reported as having failed in any subject must take that subject again in class.

Those receiving the three highest marks for the whole course in the Engineering Department and the seven highest marks in the other departments are entitled to appointment as Commencement Orators.

Absences in General.—Absences are recorded as of three kinds—permitted, excused and unexcused. No one but the President or Dean can authorize the record of an absence as permitted.

Absences are entered (in every course) against a student from the beginning of a term until he reports his return to the Registrar. A like report is required after absence because of sickness or permission.

Class-room Absences.— Students will be allowed, each term, as many absences without excuse, in any subject, as there are recitations per week in that subject.

After this limit has been reached, each additional unexcused absence will be marked as a failure in recitation, and one or more excused absences will subject the student to a special preliminary examination before he can proceed to his regular examination.

After a number of unexcused absences equal to three weeks of recitations in any subject, the student will not be allowed to continue his work in that subject, but must take it with the succeeding class.

No excuse will be granted except for protracted illness, or for reasons in every way exceptional.

This rule does not apply to examinations, or to recitations just before or after any vacation or recess, or to any class as a whole at any time, and is not to be interpreted as remitting any part of the total work of the term.

Chapel Absences.— Ten absences without excuse will be allowed each term. All absences after the first ten lower the standing at the rate of one unit for every two absences.

No absences will be excused except for protracted illness or for reasons in every way exceptional.

In the determination of a student's general standing marks for chapel attendance are counted as the equivalent of a one hour per week recitation. They affect the granting of scholarships and the selection of honor men.

Conditions.— Students admitted with entrance conditions are required to remove them not later than the examination for the removal of conditions in the following March. Students who fail to meet this requirement are classed as irregular students. No student who has any conditions unsatisfied at the close of the first condition examination of the college year will be permitted to continue with his class without the express authorization of the Faculty. Conditions not removed at the next conditions examination held after their imposition, must be made up in class at the first opportunity, and this work shall take precedence of the

regular work in case of conflict in the schedule. No Senior who has failed to make up all his back work by the end of the second term of Senior year can be recommended for a degree, except by special vote of the Faculty.

Examinations for the removal of conditions occur on the first Saturday of the Fall term, and on the first Saturday in December, March and May, as indicated in the College calendar. Registration for these examinations closes at noon on the Wednesday next preceding the date set for each. A fee of two dollars for each examination to be taken must be paid at the time of registration, at the College Office.

Students who have been excused from any term examination may be examined later, at the option of the instructor, but such examination cannot be postponed beyond the first condition examination. A failure to pass will be regarded as a condition which must be made up at the next following conditions examination.

A failure to report at any appointed examination will be regarded as a trial, unless previously excused.

Irregular Students.—Irregular Students have no class relation or class privilege; they are debarred from competition for prizes and from the attainment of special honors.

Changes of Course.— Students are not permitted to pass from one course to another, or to take any studies out of their regular order, without the specific authorization of the Faculty.

The evidence that a student's continuance in college is resulting in no advantage to himself, or in harm to others, will occasion his separation from the institution.

EXPENSES

Matriculation fee	$ 5 00
Tuition, per term	25 00
Graduate course in Electrical Engineering, tuition per term	50 00
Room rent, per term, North College.....$13 50 to	20 00
South College, per term	20 00
Incidental fee, for maintenance of public rooms, use of library, gymnasium, etc., per term	8 00
Chemical laboratory fees:	
Required course, per term	6 00
Required course in Civil and Sanitary Engineering, Junior year	13 00
Required course in Sanitary Engineering, Senior year	13 00
Elective courses, per term	13 00
Electrical Engineering laboratory fee, per term..$2 00 to	10 00
Biological laboratory fees:	
Elective courses, per term	6 00
Required courses, per term	2 00
Physical laboratory fees:	
Elective courses, per term	5 00
Required courses, per term	3 00
Conditions examination fee	2 00
Fee for certificate of work done	2 00
Fee for certificate of graduation	1 00
Graduation fee, including diploma	15 00

Students who take part of their Senior year's work at the Albany Medical College, as provided on page 60, are charged $125 for the year's tuition, $50 to be paid to the Treasurer of Union College and $75 to the Treasurer of the Albany Medical College.

Tuition is due on the first day of each college term.

Students must conform to the rules of the Treasurer's office regarding registration at the opening of each term, and will not be admitted to any classes or laboratories until the required fees are paid.

No deductions are made because of absence from college.

No part of a term bill will be refunded for any cause.

Damage done by students to College property will be charged to their account.

No degree, certificate or dismissal will be given to any student until his bills are paid.

Board can be procured for $3 to $4 a week. The total expense of tuition, room, text-books, board, lights, washing, etc., during the three terms is from $275 to $325.

College Rooms

The College has two steam heated dormitories, accommodating ninety students. Most of the rooms are arranged in suites of two, and all are unfurnished; they are rented at prices varying from $40.50 to $60.00 per year for each student occupying a room. The rooms are cared for by competent persons, employed and paid by the College. No room is secured until a lease is signed and filed in the College Office. A student must occupy the room for which he signs, as transfers are not allowed. Each occupant of a College room will be held responsible for any damage done to the room. Students about to enter College who wish rooms in the dormitories should make early application to Charles B. Pond, Assistant Treasurer. On application, a list of the rooms, giving location and price, will be furnished. It is very desirable that students about to enter College should secure their own room-mates before the College year opens. When this is not done the men will be located in the order of application. At the end of the College year students giving up their rooms for any reason whatsoever must remove all furniture and property from their rooms not later than the Saturday following Commencement Day, as after this time the dormitories will be closed until the Saturday before the first registration day of the Fall term.

Students leaving property in their rooms during the vacation season do so at their own risk.

SCHOLARSHIPS

Funds given especially for this purpose enable the College to offer aid to a number of students each year, as follows:

General Scholarships.

Scholarships covering a part or the whole of tuition charges are granted to students upon the following conditions:

1. The declaration of a purpose to remain in Union College until graduation. (Credentials necessary for admission to another college will not be given to any scholarship student until he has repaid to the college treasury the full amount of scholarship aid received.)
2. An acknowledgment that the aid received is regarded as a debt of honor, to be paid as soon as possible after leaving college.
3. The presentation of satisfactory evidence of financial need.

Scholarship aid will be withdrawn temporarily upon the failure of the student to be sustained in any subject, or upon his failure to maintain an average grade of eighty per cent. in the studies of any term, and after it has been withdrawn for three successive terms it will not be renewed.

Any serious breach of college discipline, evidence of moral delinquency, or repeated unnecessary expenditures will also result in the withdrawal of scholarship aid.

Application blanks will be provided by the President or Dean upon request.

John David Wolfe Memorial Scholarships.

The income of a Fund of Fifty Thousand Dollars established by the generosity of Miss Catharine Lorillard Wolfe is designed to aid students from the Southern States.

The scholarships are governed by the conditions named above.

Application blanks will be provided by the President or Dean upon request.

Levi Parsons Scholarships.

A generous benefaction by the late Hon. Levi Parsons, of Gloversville, N. Y., maintains several scholarships in each class, yielding about one hundred and fifty dollars a year, each; this provides for tuition, room rent and a money payment of $20 per term.

Among applicants, preference is given:

First, to blood relatives of the founder, bearing his name and living in the county of Fulton, Montgomery or Hamilton, in the State of New York, and especially to those bearing his name and living in Gloversville or Johnstown, Fulton County.

Second, to applicants living in the following places, according to the following order:

1. The city of Gloversville, Fulton County.
2. The city of Johnstown.
3. The township of Johnstown.
4. The county of Fulton.
5. The adjoining counties of Montgomery and Hamilton.
6. To blood relatives living in any other part of the United States.

Nomination to scholarships is made by the Board of Directors of the Gloversville Free Library; and the nominees must pass satisfactory examinations at the College. Applications are received by the Directors of the Gloversville Free Library, Gloversville, N. Y.

These scholarships are governed by the conditions named on page 114.

R. C. Alexander Prize Scholarship.

The sum of four thousand dollars has been given in memory of the late Robert Carter Alexander, of the class of 1880, and a life trustee of the College, to be devoted to the establishment of a scholarship for the encouragement of classical studies.

The income of this fund, amounting to two hundred dollars per year, will be awarded as a prize scholarship, upon the conditions named below:

Conditions.

1. Candidates must be students in the Classical course, and of approved moral character.

2. They must be free from conditions, and must have obtained an average of at least eighty per cent. in the studies of the first two terms of the Freshman year.

3. They must pass successfully a special examination at the close of the Freshman year in each of the following subjects: Latin, Greek, Mathematics, English Composition, and either French or German. These examinations will be based upon the work of the Freshman year.

4. The award will be made to the candidate obtaining the highest general average in these examinations and in all the previous work of his college course.*

5. The Prize Scholarship will be forfeited upon evidence of moral delinquency, or upon failure to maintain an average grade of ninety per cent. in the work of any subsequent term. The scholarship, once lost, cannot be regained, but will be awarded, upon the above conditions, to a student in the next entering class.

6. All questions pertaining to the administration of this scholarship will be determined by a committee composed of the President of the College, the Chairman of the Scholarship Committee of the Faculty, and a member of the Board of Trustees.

*This scholarship is now held by Harry Cook, of the class of 1906.

PRIZES

Blatchford Oratorical Medals.

The Hon. Richard M. Blatchford, LL. D., of New York city, founded oratorical prizes, consisting of two gold medals of the value of the interest on $1,000, which are given to the two members of the graduating class who deliver at Commencement the best orations, "regard being had alike to their elevated and classical character and to their graceful and effective delivery." These medals are awarded by a committee appointed by the Trustees, and are presented at the close of the exercises.

Warner Prize.

The Hon. Horatio G. Warner, LL. D., of Rochester, N. Y., founded an annual prize, consisting of silver plate of the value of $28, to be presented at Commencement to the "graduate of Union College, Classical course, who shall reach the highest standing in the performance of collegiate duties, and also sustain the best character for moral rectitude and deportment, without regard to religious practice or profession." The prize is awarded by the Faculty.

Ingham Prize.

The Hon. Albert C. Ingham, LL. D., of Meridian, N. Y., founded an annual prize of the interest on $1,000 (in the form of plate, or medal, or money, or both medal and money, as preferred), to be awarded at Commencement to that Senior connected with the College for not less than two years who shall offer the best essay on one of two assigned subjects in Englih Literature or History.

The essay must be typewritten, and must contain not less than 4,000 nor more than 4,500 words. Its signature (fictitious) and the writer's real name must be enclosed in a sealed envelope; the signature and the name of the prize being given on the outside. The essay, with the note, must be presented by noon on the fifteenth day of May.

Allen Essay Prizes.

The Hon. William F. Allen, LL. D., of Oswego, N. Y., established a fund of $1,000, the interest of which is devoted to prizes for the best three essays on any subject, submitted by members of the Senior class.

The essay must be typewritten, and must contain not less than 2,500 nor more than 3,000 words, and must be signed and presented (with note, as in the case of the Ingham Essay) by noon on May 15th. The prizes are awarded at Commencement.

The Rankine Prize for Extemporaneous Speaking.

A prize of $50 in money is awarded to that member of the College who shall deliver the best extemporaneous speech at a public competition to be held in Commencement week in each year. The award is made by a committee appointed by the donor, and is based on the following considerations: (1) The appropriateness and correctness of the subject matter; (2) the logical force of the argument; (3) the excellence of the style; (4) the grace and effectiveness of the delivery. All students in regular standing are eligible. The number of competitors is, however, limited to ten.

Oratorical Prizes.

Prizes are presented at Commencement to the two Juniors and the two Sophomores who deliver the orations best in composition and delivery on the occasion of Prize Speaking in Commencement week. Four Juniors and four Sophomores are selected for this competition by a committee of the Faculty on the fifteenth of April. Candidates must be in full standing on appearance before the committee.

Allison-Foote Prize.

Founded by George F. Allison, of New York city, and Wallace T. Foote, of Port Henry, N. Y., for the encouragement of debate in the Literary Societies. The prize consists of $100 in cash, and is to be awarded as the result of a public competition between representatives of the Adelphic and Philomathean Literary

Societies. Fifty dollars will be awarded to the society presenting the strongest argument. The remaining $50 will be awarded to the debater who makes the best single speech, regardless of his society relations. Contestants must have engaged in at least ten debates in their respective societies during the college year immediately preceding. All further details are to be left to the determination of a committee, consisting of the President, the Dean of the College, and the Professor of Rhetoric.

John K. Porter Memorial Scholarships.

A fund given by Mrs. John K. Porter, in memory of her husband, is designed to assist students who, after graduating from college, pursue the study of law. The fund provides, at present, for three scholarships of ninety dollars each. The awards will be made at Commencement to Seniors chosen by the Faculty.

Gilbert M. Speir Memorial Scholarship.

A fund given by Mrs. Glover C. Arnold, in memory of her father, the late Judge Gilbert M. Speir, provides another scholarship for students of law who go from Union College to the Albany Law School, another department of Union University.

The sum of ninety dollars will be awarded at Commencement to the Senior chosen by the Faculty, the choice being made on the basis of excellence in historical studies.

Applicants for Law School scholarships must register at the College office by May 1st of Senior year.

Daggett Prize.

In 1899 Miss E. Josephine Daggett bequeathed to Union College the sum of $1,000, the interest of which is devoted to a prize for conduct and character, without respect to scholarship, to be given at Commencement to a Senior who shall have passed through a full course of four years at the College.

DEGREES AND HONORS

Degrees.

The degrees of the College are conferred in harmony with a resolution of the Board of Trustees, which says: "The successful completion of the Classical course [Course 1, page 59] shall entitle the student to the degree of Bachelor of Arts; of the Latin-Scientific course [Course 2, page 59] to the degree of Bachelor of Philosophy; of the Scientific course [Course 3, page 59] to the degree of Bachelor of Science; of one of the Engineering courses [Courses 4, 5, 6, pages 59 and 60] to the degree of Bachelor of Engineering; of the Graduate course in Electrical Engineering [Course 7, page 60] to the degree of Electrical Engineer. The candidate for a degree must have entered college before the close of the first Senior term, must have paid all dues to the College Treasurer, and returned all books borrowed from the Library. He must also attend the conferring of Degrees, or be expressly excused therefrom.

The degree of Master of Arts or of Master of Science will be given to graduates of Union College who have been registered as candidates for the degree not less than two years, have completed definite courses of advanced study in two departments, and have submitted a satisfactory thesis and passed satisfactory examinations. The total amount of work done is intended to be the equivalent of one year of resident study.

A year of resident study in any non-professional graduate school, approved at the time of registration by the two departments concerned, will be accepted instead of the two years' study above mentioned on fulfilment of the same conditions regarding thesis and examinations.

Each candidate for this degree must register his name, address, and the two departments chosen, with the Dean of the College not later than the fifteenth of October of the year for which he desires registration.

The thesis must be presented to the Dean by May 1st for submission to the Faculty in time to provide for all necessary examinations before commencement.

A fee of $20 is charged, which covers examinations and diploma; of this amount $10 is payable at the time of registration and $10 at the time of the final examinations.

Honors.

All Commencement prizes are limited to A. B., B. S., or Ph. B. students who have entered at or before the beginning of the Senior year, and who are in full standing at the close of the second term; and to Engineering students entered likewise and in full standing at the close of the second term, in both the Engineering course and the English department of the B. S. or Ph. B. course.

Commencement Appointments.

These honors are assigned to ten Seniors on the basis of scholarship, as stated under Standing, page 109. Provisional appointments are made at the close of the second term Senior, and become final if those who receive them retain the same relative rank to the end of their course. Under present regulations, no other persons can become competitors for the Blatchford Oratorical Medals.

Seniors not in full standing at the close of the second term shall be considered ineligible to a Commencement appointment.

Places gained as the result of the third term's work shall be on the excused list, unless ordered otherwise by special vote of the Faculty.

The Valedictory.

This honor is awarded to the Senior of highest standing among the ten receiving Commencement appointments.

Special Honors.

Special Honors are also given at graduation in each of the following subjects: Greek, Latin, English, French, German, Mathematics, Physics, Chemistry, Biology, Economics, History, Sociol-

ogy and Philosophy. The work required in each case will be the equivalent of three terms of class-room work of two hours per week each and will be outside of the prescribed or elective courses. The candidate for Special Honors must apply to the head of the department in which he proposes to take Honors not later than the first Monday of the Spring term of the Junior year. He must attain in all the studies of the department in which he tries for Honors a rank of not less than ninety per cent. of the maximum. The evidence that he has successfully completed the extra course prescribed for him must be submitted not later than June 1st of the Senior year to the Faculty, who shall decide in each case whether the work done is worthy of an Honor. The Honors attained are stated in the diploma, and the names of the students who take Honors are printed on the Commencement programme.

DEGREES CONFERRED

AT THE

ONE HUNDRED AND SEVENTH ANNUAL COMMENCEMENT

June 10, 1903.

HONORARY.

LL. D.

WILLIAM R. HUNTINGTON..... New York, N. Y.
ANDREW KIRKPATRICK, '63..... Newark, N. J.

D. D.

HENRY D. B. MULFORD..... New Brunswick, N. J.
SETH CURTIS BEACH, '63..... Wayland, Mass.

Ph. D.

CHARLES P. STEINMETZ..... Schenectady, N. Y.

A. B.

SOLOMON W. RUSSELL, as of class of '63. Salem, Mass.

IN COURSE.

A. M.

ROBERT CALVIN GAMBEE..... Class of '99.
JAMES NEWELL VANDER VEER..... Class of '99.
GEORGE MARTIN WILEY, JR..... Class of '99.

CLASS OF 1903.

A. B.

ROBERT FINNEY BARRETT..... Plattsburgh.
JOHN ALBERT BOLLES..... Kortright.
FRANK H. DALEY..... Coxsackie.
THOMAS G. DELBRIDGE..... Batavia.
GEORGE WILLIAM DONNAN..... Troy.

RAYMOND CURTIS DONNAN..... Troy.
SAMUEL B. HOWE, JR..... Schenectady.
HENRY ARTHUR PEARCE..... Plainfield, N. J.
GORDON EMMONS VAN LOON..... Coxsackie.

Ph. B.

FREDERICK JANSON BALZ..... Amsterdam.
MOREY CHARLES COLLIER..... Savona.
JOSEPH GEORGE FENSTER..... Troy.
JAMES Q. GULNAC..... Binghamton.
HERBERT G. HOXIE..... Cambridge.
LOUIS TIFFANY HUNT..... Ephratah.
ALLEN STEELE PECK..... Batavia.
FREDERIC H. POWELL..... Worcester.
LOUIS F. SCHROEDER..... Port Leyden.
THOMAS RICHARD TILLOTT, JR..... Schenectady.

B. S.

ARTHUR ERNEST BISHOP..... Oneonta.
JOSEPH R. BROWN, JR..... Seward.
GUY BROWN GRISWOLD..... Whitehall.
CLINTON BENJAMIN HAWN..... Albany.
ALBERT HENRY KESSLER..... Schenectady.
EDWARD HOLLAND RIDER..... Unadilla.
JOHN LEOPOLD STAEBER..... Lancaster.

B. E.

WILLIAM J. DICKENSON..... Flycreek.
LAWRENCE J. GALLAGHER..... Troy.
OTIS F. LEWIS..... Gilboa.
JAMES FRANKLIN MORGAN..... Fort Edward.
FRANCIS JAMES MULVANEY..... Worcester.
GLOWACKI PARKER..... Batavia.
ARTHUR GUY PICKENS..... Cooperstown.
HARRY P. WILLIS..... Schenectady.

AWARDS

Valedictory.

THOMAS G. DELBRIDGE.....Batavia.

Commencement Orations.

JOHN ALBERT BOLLES.....Kortright.
HERBERT G. HOXIE.....Cambridge.
HENRY ARTHUR PEARCE.....Plainfield, N. J.
FREDERIC H. POWELL.....Worcester.
THOMAS RICHARD TILLOTT, JR.....Schenectady.
GORDON EMMONS VAN LOON.....Coxsackie.

Engineering Theses.

WILLIAM JAY DICKENSON.....Flycreek.
ARTHUR GUY PICKENS.....Cooperstown.
HARRY P. WILLIS.....Schenectady.

Special Honors.

In English .....FREDERIC H. POWELL.
In History .....JOHN ALBERT BOLLES, JOSEPH R. BROWN, JR., FREDERIC H. POWELL.
In Chemistry .....THOMAS G. DELBRIDGE.
In French .....GORDON E. VAN LOON.
In German .....GORDON E. VAN LOON.

Warner Prize.

For Seniors.

THOMAS G. DELBRIDGE.

Blatchford Oratorical Medals.

For Seniors.

1st. THOMAS RICHARD TILLOTT, JR.
2nd. THOMAS G. DELBRIDGE.

Ingham Prize.

For Seniors.

HENRY ARTHUR PEARCE.

Allen Essay Prizes.

For Seniors.

1st. GEORGE WILLIAM DONNAN.
2nd. ARTHUR ERNEST BISHOP.
3d. HENRY ARTHUR PEARCE.

Daggett Prize.

RAYMOND CURTIS DONNAN.

Holleran Prize.

To the Senior Engineer of Highest Standing.

HARRY P. WILLIS.

Junior Oratorical Prizes.

1st. ARCHIBALD HAMILTON RUTLEDGE.
2nd. CORNELIUS LANSING HAYS.

Sophomore Oratorical Prizes.

1st. CLARENCE STILMAN AMES.
2nd. MORRIS THOMAS RAYMOND.

Allison-Foote Prizes.

Won by the Philomathean Society
and
JOHN ARTHUR BOLLES,
Class of 1903.

R. C. Alexander Prize Scholarship.

HARRY COOK,
Class of 1906.

John K. Porter Memorial Scholarships.

Herbert G. Hoxie.
Frederic H. Powell.
Thomas Richard Tillott, Jr.

Gilbert M. Speir Memorial Scholarship.

John Albert Bolles.

The Rankine Prize for Extemporaneous Speaking.

Louis Tiffany Hunt.

Phi Beta Kappa.

From the Class of 1902.

William Hugh Gillespie.
Fraser Metzger.

From the Senior Class.

Thomas G. Delbridge.
Henry Arthur Pearce.
Gordon E. Van Loon.

Sigma Xi.

From the Senior Class.

Thomas G. Delbridge.
William Jay Dickenson.
Glowacki Parker.
Harry P. Willis.

SCHOOL OF ENGINEERING

UNION COLLEGE

SCHENECTADY, N. Y.

FACULTY

ANDREW V. V. RAYMOND, D. D., LL. D.
President.

WILLIAM WELLS, PH. D., LL. D.,
Professor Emeritus of Modern Languages and Literature.

OLIN H. LANDRETH, A. M., C. E.,
Professor of Civil Engineering.

THOMAS WALLACE WRIGHT, A. M., PH. D.,
Professor of Mathematics.

BENJAMIN H. RIPTON, PH. D., LL. D., DEAN
Professor of History and Sociology.

JAMES H. STOLLER, A. M., PH. D.,
Professor of Biology and Geology.

EDWARD EVERETT HALE, JR., PH. D.,
Professor of English.

CHARLES PROTEUS STEINMETZ, A. M., PH. D.,
Professor of Electrical Engineering.

HOWARD OPDYKE, A. B.,
Professor of Physics.

FRANK B. WILLIAMS, C. E., M. S., PH. D.,
Assistant Professor of Civil Engineering.

FREDERICK EDWARDS, C. E.,
Assistant Professor of Civil Engineering.

RICHARD S. CURTISS, PH. D.,
Assistant Professor of Chemistry.

JOHN L. MARCH, A. M., PH. D.,
Assistant Professor of Modern Languages.

R. NEIL WILLIAMS, E. E.,
Assistant Professor of Electrical Engineering.

HAMILTON W. MABIE, LL. D.,
Lecturer on English Literature.

CARL A. ERNST, PH. D.,
Lecturer on Electrochemistry.

HERBERT L. TOWNE, M. D.,
Instructor in Physical Culture.

CLARENCE T. COLEY, M. E.,
Instructor in Electrical Engineering.

CARL A. KRAUSE, A. M.,
Instructor in Modern Languages.

C. F. F. GARIS, PH. B.,
Instructor in Mathematics.

GORDON E. VAN LOON, A. B.,
Instructor in Modern Languages.

JOHN C. PARKER, A. M.,
Instructor in Electrical Engineering.

FRANK COE BARNES, PH. D.,
Instructor in Modern Languages.

SCHOOL OF ENGINEERING

Department of Civil Engineering.

Department of Sanitary Engineering.

Department of Electrical Engineering.

This school was founded in 1845. Its object is to give its students such instruction in the theory and practice of one or more of the divisions of Engineering as shall qualify them for immediate usefulness in subordinate engineering positions, and at the same time fit them to fill satisfactorily the higher positions in the profession, after a moderate amount of experience in the routine of practice. The course of instruction aims to effect this by lectures and the study of text-books, combined constantly with exercises in laboratory work and mechanical drawing, instrumental field practice, office computations and designing practice.

The connection of the Engineering School with the College affords its students peculiar advantages for study in the various departments of the latter, to all of which they are admitted without extra charge. Systematic work in a number of these departments forms an integral part of each of the Engineering courses, as will be seen from the curriculum.

The location of Schenectady is most favorable for an Engineering School. The city is on the Mohawk River and is intersected by several railroads and the Erie Canal. These present many bridges and other works interesting to the Engineering student. There are also extensive Electrical Works, Locomotive Works, Machine Shops and Foundries, all of which afford special advantages for examination and study.

For information regarding requirements for admission, expenses, and terms and vacations, see pages 61 to 68; 112, 113; 7, 8, 9.

Degrees.— Three courses in Engineering are offered, viz: A general Civil Engineering course, which is intended to give the basis of an Engineering education, including the fundamental principles of all special branches of the profession, a knowledge of both French and German, and a course in English; a special course in Sanitary Engineering, which differs from the general course in substituting special work in Sanitary Engineering for some of the general Engineering studies; and a course in Electrical Engineering. The degree of Bachelor of Engineering is given for the successful completion of any one of these courses. These three courses are alike during the early part of each course, but widely different during the later part. This permits a student to defer the selection of his particular course until he has become somewhat familiar with the characteristics of the several courses and with his own preference and capabilities. It is intended that the diplomas in Engineering shall be a guaranty of more than average ability and industry. Students not graduating receive certificates stating what they have done, both as to quantity and quality. Candidates for graduation must have presented a thesis completed according to the regulations of the School; must also have paid all dues at the College Treasury; must have returned all books taken from the College Library; and must be present at the conferring of degrees, unless expressly excused.

Architectural Students will find a large part of the general course adapted to their requirements; particularly the Drafting, Mensuration, Stereotomy, Strength of Materials and the study of Difficult Foundations, Building Construction, Heating and Ventilation, etc.

ADMISSION

General Conditions for Admission.

[See page 61.]

Requirements for Admission.

Candidates for admission to the Freshman class in any of the Engineering courses are required to pass satisfactory examinations in, or present approved certificates covering the following subjects:

English Literature, Arithmetic, Algebra, Plane and Solid Geometry, Plane Trigonometry, Physics, Modern Geography, History of the United States, Physiology, and German or French, as given in detail on pages 62-67.

SUBJECTS OF STUDY

Mathematics.

The studies of this department include the following: Algebra (completed), Spherical Trigonometry, Analytic Geometry, Descriptive Geometry, Differential and Integral Calculus. Optional courses in Higher Mathematics are also offered. See also pages 77, 78.

Mechanics and Physics.

The following are the subjects included in the course:

In Analytical Mechanics.—Statics, Dynamics, Hydrostatics, Hydrodynamics, Pneumatics.

In Physics.—Optics, Acoustics, Heat, Electricity, Magnetism and Galvanism. Physical Laboratory practice is required of all Engineering students. See also pages 78, 79.

Astronomy.

The instruction in Astronomy includes Spherical Astronomy, Theory of Astronomical Instruments, and Physical Astronomy. The students are also given a practical course in Astronomical Surveying and Location. In the Electrical Engineering course the work is confined to Descriptive Astronomy.

Biology.

Physiology is a required study in each of the three Engineering Courses. Structural Botany is required in the General and Sanitary Course, and Bacteriology is required in the Sanitary Course. Structural Botany includes the microscopical study of the vegetable cell, the tissues and the tissue-systems of the higher plants, with special reference to the uses of woods in the constructive arts. In Bacteriology some of the common bacteria of water, air and soil are studied according to the methods of modern bacteriological research. The accompanying lectures treat of bacteria in regard to their place and role in nature, their relations to sanitary science, etc. In this work the student uses the microscope, prepares sections, etc. See also pages 82, 83.

Geology.

The required work comprises a course in Economic Geology, which includes the explanation of the general principles of geology, and a description of the occurrence and distribution of the mineral deposits and materials for construction in the United States.

Chemistry.

General Chemistry is taught by recitations, lectures and laboratory work during Freshman and Sophomore years and laboratory work in qualitative analysis is continued through the first term of the Junior year.

Sanitary Engineering students, in addition to the above, take Chemical Laboratory work during the first and second terms of the Senior year.

Modern Languages.

All Engineering students are required to take one year of Elementary French and one year of Advanced German, or *vice versa.*

Electrical Engineering students also have one term of Scientific French and Scientific German during the Senior year.

See pages 71, 72, for a description of these courses.

English Literature and Rhetoric.

The instruction in English is eminently practical and has special reference to the clear and forcible presentation of a subject by a student. The full course in English Literature is laid down on page 73. The full course in Rhetoric is to be found on pages 72, 73. The course required of Engineering students is somewhat abridged, so as to embrace those portions deemed most important for their special needs.

In the Senior year one of the required essays of each term will be upon a technical subject, prepared under the direction of the Professor of Civil Engineering, the object being to give the Engineering student practice in the preparation of reports upon Engineering subjects.

ENGINEERING

General Engineering Course

The subjects of this course are so arranged as to harmonize with the seasons of the year suitable to field and other work. The course includes the following subjects:

Drawing and Descriptive Geometry.—The instruction in this line of work extends throughout the entire course. In the first term Freshman the student is instructed in freehand drawing from the flat and from the object, and in freehand lettering. In the second term he is instructed in the use of drawing instruments and the construction of geometrical problems and lettering. In the third term Freshman and first term Sophomore he obtains practice in plotting the surveys made in the field. Further instruction in Topographical Drawing is given in the first term Sophomore. Descriptive Geometry is begun in the second term Sophomore, and in addition to thorough instruction in the theory an effort is made to illustrate by problems some of the most common applications in practice. Schroeder's and the Olivier models and the models of intersections of the Paris Polytechnic School are freely used. The collection of models is described on pages 150, 151. In the third term instruction is given in Shades, Shadows and Perspective and the various projections. In the Junior year the work in drawing includes model and machine drawing and the solution of problems in Graphical Analysis. In the Senior year is given a thorough course in the designing of Engineering structures, including detail drawings of constructions of wood and iron; this is followed by a course of Stereotomy, with drawings from the Stereotomy models of the Paris Polytechnic School. Practice in blue printing is made a part of these courses.

Surveying.—The third term Freshman includes instruction and practice in the elementary operations in the field with chain and tape, compass, transit, level and rod. Whenever possible, the class is exercised in actual work in laying out lots, surveying

lands and computing areas, establishing grades for streets and roads and determining differences in elevation. In the first term Sophomore the subject of Topographical Surveying is taken up and instruction and practice are given in the various methods and instruments. Railroad Surveying is treated in the third term Junior, and the students are given exercise in the principal field operations on railroad surveys, office and field location and staking out for construction. The subject of railroad construction and equipment is not treated until the first term of the Senior year.

Geodesy and Astronomical Surveying in the third term of the Senior year comprise a discussion of the figure of the earth; triangulation system; base lines; observations; reductions and adjustment, determination of time, latitude and azimuth; transformation of co-ordinates, map projection.

As a preliminary to instruction in each branch of surveying, a thorough study of the instruments employed is taken up, treating their geometrical, optical and mechanical relations; their adjustments, use and the determination of their instrumental constants, errors and limits of precision.

Office computations, plotting and mapping are made adjuncts of field surveys.

Field practice forms an important part of all of the courses in surveying, the classes being divided into sections, and directed by the instructors.

When feasible, about three weeks of uninterrupted field and office practice will be given in the Junior or Senior year.

Applied Mechanics and Materials.—Applied Mechanics is commenced in the first term of the Junior year, and comprises the extension of Analytic Mechanics and the study of Graphical Analysis, and their applications to engineering problems, operations and constructions, particularly the treatment of stresses, strains, deflections and deformations in elastic materials and structures due to extraneous forces. Closely allied to this are the studies of Hydraulics and Masonry, the former comprising the study of flow through orifices, weirs, pipes and channels, and the development of water power; the latter comprising the

mechanics of foundations, piers, abutments, arches, retaining walls, dams, etc.

In conjunction with the above subjects is given the study of the production, preparation, strength and physical properties of the various engineering materials, including timber, stones, mortar, cement, cast iron, wrought iron and structural steel. Practice in the Engineering Laboratory is an important adjunct to this study. This entire division, properly correlated, becomes the foundation of all rational engineering design and construction.

Engineering Design.—The courses in Applied Mechanics and materials prepare the student to undertake the study of Engineering Design proper, which is done throughout the Senior year, as an important feature of the work in bridges, railroads, waterworks, architectural engineering, etc. The exercises in this line of work are, as far as possible, assigned from professional practice, and the student is expected to carry out, from assigned data and conditions, the preliminary study, determinations of stresses, types, dimensions and details, and to turn in the results in the form of working drawings, diagrams and memoirs. There is a large collection of drawings of representative engineering structures in the department, from which students can obtain correct ideas of modern practice in the designing of details and the methods of the various large companies engaged in this branch of construction.

Water.— The subject of water supply is considered in all its aspects. In the first term Junior is given a laboratory course in Chemistry, followed by a course in water analysis. In the third term Junior is given a course in Hydraulics, followed in the Senior year by a fuller development of the principles as applied to the supply of water to cities and villages. This is accompanied by a study of the sanitary aspects of the subject of water supply and preservation of the same from contamination. Some study is also made of pumping engines.

Highways.— The study of highways in the first term of the Junior year comprises a consideration of the highway as an ele-

ment in the transportation and social system of the State, the principles of its economic location and proper construction; a study of the various modes of construction and the materials employed; its proper maintenance; systems of highway administration.

Streets and Pavements.—A study of the methods of laying out and grading streets and pavements, and of the various paving methods and materials, and their treatment, with special reference to their economic and sanitary aspects, is given during the second term of the Junior year.

Motors and Motive Power.—Following the work in Thermodynamics and Hydraulics of the third term of the Junior year, an outline course in motors and motive power is given in the first and second terms, Senior year, comprising a study of the sources of demand and supply of power, steam boilers, steam engines, gas engines, water wheels, electric motors, etc.

Engineering Law and Procedure.—Three hours per week during the last term Senior year are assigned to the study of the principles and procedure of contracts, agency, corporations, commercial and financial transactions, law relating to land boundaries and titles, water courses, surveys, mining claims, etc. During the first and second terms of the Freshman year and the third term of the Senior year a series of lectures is given on topics pertaining to the training and the qualifications of engineers and to engineering practice.

Sanitary Engineering Course

The course in Sanitary Engineering differs from the general Engineering course by omitting the Astronomical Surveying, Geodesy and Railroad Construction, and substituting therefor Heating and Ventilation, House Drainage and Plumbing, Sewerage and Sewage Disposal, Sanitary Biology, Sanitary Codes and Laws, and an increase in the amount of Chemistry and Chemical Laboratory work.

Sanitary Condition of Houses.—In the first term Senior will be given courses in Heating and Ventilation and in House Draining and Plumbing. The latter course will have special attention given to it, and methods of water supply and of the removal of house wastes of buildings in all locations, from the isolated country house to that in a thoroughly drained city, will be considered.

Sewerage and Draining.—The study of systems of sewerage and drainage and sewage disposal will extend through the last term Senior. The comparative advantages of various systems will be shown, and the details of construction and maintenance will receive careful attention.

A course of lectures in the third term Senior will present the basis for the preparation of sanitary codes and the principles upon which laws touching the subject of the public health are based.

Electrical Engineering Course

A course of Electrical Engineering was first offered and students admitted to the lower classes in the Fall of 1895. The course has now been reorganized and a Department of Electrical Engineering established, with greatly increased facilities in the electrical laboratory.

The course of studies offered by the Department of Electrical Engineering aims at a thorough and broad scientific education of the prospective engineer, rather than the specific training of a specialist. The instruction, therefore, consists of three classes of studies. The general culture studies furnish such training as is now considered essential for every educated man, as languages, literature, history, etc. Such instruction extends over a large part of the first two years, and is then followed by a broad and general technical education, giving the student the fundamental principles and their application to all branches of engineering. Ultimately follows the specific instruction in Electrical Engineering, which, while it enables the student, after graduation, to enter the field of Electrical Engineering practice in the manufac-

turing or operating company or consulting engineer's office in a subordinate capacity only, has given him all the necessary requirements to gather in a few years' practice the knowledge needed for independent work of greater magnitude.

The instruction especially aims at a thorough understanding of the fundamental principles rather than a memorizing of numerous facts—that is, aims at quality, and not quantity—and as far as possible in all engineering instruction the subject is brought before the students in three different ways: by a theoretical lecture course with recitations, practical instruction in the electrical laboratory parallelling the lecture course, and, following after this, the application of the knowledge gained in lecture courses and laboratory to calculation and design in the drafting room. Throughout the technical course, by work in the laboratory, some familiarity with the apparatus is given to the students before the technical side is taken up in the lecture course, so that when approaching the theoretical studies of electrical phenomena or apparatus the student is already able to appreciate the practical value and importance of the subject with which the theoretical investigations deal.

Through the active interest which the General Electric Company takes in technical education, an arrangement has been effected between the College authorities and the officials of the company by which the students in the Junior and Senior classes are admitted to the company's works at regular scheduled times, under the direction of their instructor, with the privilege and opportunity of studying and inspecting the plant and operations and of being regularly instructed therein. The work has been systematically arranged, and is given simultaneously with the corresponding class and laboratory work, to which it forms an important and valuable adjunct.

The active interest taken by the prominent engineers of the General Electric Company has made it possible to offer to the Junior and Senior classes a systematic lecture course on the different branches of Electrical Engineering, in which the lecture on each topic will be delivered by the specialist who is the highest authority in this branch of Electrical Engineering.

The following plan of study is being introduced:

I. General Culture Studies

French:

3 terms, 3 hours, Freshman year.
2 terms, 1 hour, technical French, Senior year.

German:

3 terms, 3 hours, Freshman year.
1 term, 1 hour, technical German, Senior year.

Logic and Composition: Essays and Orations:

3 terms, 2 hours, Freshman year.
3 terms, 1 hour, Sophomore, Junior and Senior years.

English Literature:

2 terms, 3 hours, Sophomore year.

General History:

1 term, 2 hours, Sophomore year.

American History:

1 term, 2 hours, Sophomore year.

Hygiene, including "First Aid to the Injured":

1 term, 2 hours, Sophomore year.

Biology:

1 term, 3 hours, Sophomore year.

Mineralogy and Geology, with Special Reference to Engineering Application:

1 term, 3 hours, Sophomore year.

Descriptive Astronomy:

1 term, 2 hours, Sophomore year.

Economics:

1 term, 3 hours, Senior year.

Gymnastics, Hygiene, Physiology of Exercise:

3 terms, 1 hour, Freshman and Sophomore years.

II. General Technical Studies

Mathematics:

Algebra, 4 hours first term Freshman year.
Analytic Geometry, 4 hours second and third terms Freshman year.
Plane Trigonometry, 1 hour third term Sophomore year.
Calculus, 4 hours, 3 terms, Sophomore year; 1 hour, 3 terms, Junior year.
Synthetic Geometry, 3 terms, 2 hours, Junior year.
Natural Perspective, 1 hour, Junior year.

Physics:

Experimental Physics, 3 terms, 1 two-hour lecture, Freshman year.
Physics and Physical Laboratory, 3 terms, 5 hours, Sophomore year.

Chemistry:

Experimental Chemistry, 3 terms, 1 two-hour lecture, Freshman year.
Chemistry and Chemical Laboratory, 3 terms, 4 hours, Sophomore year.
Analytical Chemistry, 1 term, 3 hours, Junior year.

Freehand and Mechanical Drafting:

2 terms, 3 afternoons, Freshman year.

Mensuration:

1 term, 2 hours, Freshman year.

Civil Engineering:

Surveying Practice, 1 term, 4 afternoons, Freshman year.
Elements of Civil Engineering, 1 term, 2 hours, Junior year.

Applied Mechanics:

2 terms, 3 hours, Junior year.

Hydraulics:

Theory of Hydraulic Machinery, Waterwheels, Turbines, etc., 1 term, 3 hours, Junior year.
Turbine Design and Drawing, 2d term, 2 afternoons, Junior year.

Steam Engineering:

Theory of the Steam Engine, 2d term, 3 hours, Junior year.
Engine Design and Drawing, 3d term, 3 hours, Junior year.
Valve Gear and Control, 2d term, 2 hours, Junior year.
Flywheel and Regulation, 3d term, 1 hour, Junior year.
Steam Locomotive and Traction, 3d term, 2 hours, Junior year.

Thermodynamics and Gas Engines:

1st term, 3 hours, Senior year.

Engineering Law and Procedure:

1 term, 2 hours, Senior year.

III. Electrical Engineering Studies

Sophomore Year:

Electrical Laboratory, 1 afternoon, 2 terms.

JUNIOR YEAR:

Direct Current Circuits, Apparatus and Machines, 1st and 2d terms, 2 hours.
Calculation and Design, 2d and 3d terms, 1 afternoon.
Laboratory, 1st term, 2 afternoons; 2d term, 1 afternoon.
Alternating Current Circuits and Phenomena, 2d term, 2 hours.
Generators and Synchronous Motors, 3d term, 2 hours.
Transformers, 3d term, 2 hours.
Laboratory, 2d term, 1 afternoon; 3d term, 1 afternoon.
Electro-Chemistry, 2d term, 2 hours.
Illumination and Illuminants, 2 terms, 2 hours.
Telegraph and Telephone, 1 term, 2 hours.
Meters and Instruments, 1 term, 2 hours.
National Electric Code of Wiring and Fire Underwriters' Rules. Laboratory, 3d term, 1 afternoon.

SENIOR YEAR:

Electric Railway and Traction, 2d term, 2 hours.
Railway Design and Calculation, 2d term, 1 afternoon.
Induction Machines, 1st term, 2 hours.
Converters, 1st term, 2 hours.
Transmission and Distribution, 2 terms, 3 hours.
Alternating Current Design and Calculation, 1st term, 1 afternoon.
Electrical Laboratory, 2 afternoons.
Modern Theory of Electrical Engineering, 3 terms, 2 hours.
Oscillating Currents and High Frequency Phenomena, 2 terms, 1 hour.
Electro-Chemistry, 1 term, 2 hours.
Lecture Course by Specialists, 1 term, 2 hours.

Graduate Course—One Year

To those students who, after graduating from the four-year Electrical Engineering course, desire to increase their knowledge, a Graduate Course is offered in which, besides instruction

in higher branches of Electrical Engineering, there will be occasion to carry out original investigations under the supervision and with the assistance of specialists prominent in Electrical Engineering practice on subjects closely connected with the most recent advance of Electrical Engineering. In return for the assistance offered to the Graduate students in their research work by prominent specialists the Graduate students will be required to devote a small part of their time to assisting the regular University instructors in laboratory instruction. This course leads to the degree of Electrical Engineer, and is open to graduates of Union College or of other institutions approved by the Faculty.

Some of the courses offered to the graduate students are:

Advanced Calculus, 1 term, 1 hour.

Differential Equations, 1 term, 1 hour.

Long Distance Transmission, 2 terms, 2 hours.

Design and Control of Electric Power Systems of Very Great Magnitude, 2 terms, 2 hours.

Electric Railway and Traction, continued, 3 terms, 2 hours.

Modern Theory of Electrical Engineering, continued, 3 terms, 2 hours.

Oscillating Currents and High Frequency Phenomena, 2 terms, 1 hour.

Lightning and Lightning Protection, 1 term, 2 hours.

Wave Transmission, with Special Application to Telephony, 1 term, 2 hours.

Scientific Foundations of Electrical Engineering, 2 terms, 2 hours.

Electro-Chemistry, 1 term, 2 hours.

Chemistry of Very High Temperature, 1 term, 2 hours.

Laboratory.

Research Work.

Special Graduate Courses

Graduates of Union College, or of other institutions approved by the Faculty, or students approved by the Department of Electrical Engineering and by the Faculty as having knowledge fully equivalent to that of graduate students, will be admitted to some of the studies of the Graduate Course as Special Graduate Students.

It is the intention of the College to offer Special Graduate Courses of one year for those who, after graduation from Electrical Engineering courses, desire to acquire additional knowledge in other branches.

Voluntary Studies.

Any of the studies of the Classical or of the Scientific course of the College may be taken by Engineering students without extra charge.

Final Examinations.

During the Senior year a series of Final Examinations will be held covering the more important subjects of the entire course. The list of subjects in which examinations are to be given during any term will be determined by the Faculty.

Thesis.

Each candidate for graduation is required to present on or before the first Wednesday in June of his graduation year a satisfactory thesis on a subject that has been approved by the Professors of Civil or Electrical Engineering. This thesis must be original in its character, and may be either a design for some engineering structure, plant, process or operation, or an independent investigation of some principle, problem or matter of engineering importance. Reviews of existing structures, plants or processes, unless of special educational value and containing original investigation, will not be approved as subjects. This thesis is to be in a form prescribed at the time of approval of

the subject, and is to be bound for deposit in the library of the Engineering School, and must be presented in this shape on or before the stipulated date. The subjects, with outlines of the proposed treatment, must be submitted for approval not later than January 1st of each year, and the work on the thesis must be presented for the inspection and criticism of the Professor in charge of the Department at intervals during its progress.

Instruments and Apparatus.

The School is supplied with field instruments of the best description, comprising a large Theodolite, suitable for refined geodetic operations, Transits, Surveyors' Compasses, Prismatic Compasses, Burnier's Compass, Solar Compass, Y Levels, the Levels of Troughton, Egault, Lenoir and Burnier; Plane Table, Sextant, Octant, Mountain Barometers, Aneroid Barometer and a Marine Chronometer.

The extensive private collection of models and instruments belonging to the late Professor Gillespie has been purchased for the Engineering School.

The collection of models in Descriptive Geometry and Stereotomy is very complete. The following are some of the most important:

The Olivier Collection.—This consists of about fifty models, representing the most important and complicated ruled surfaces of Descriptive Geometry, particularly warped or twisted surfaces. Their directrices are represented by brass bars, straight or curved, to which are attached silk threads representing the elements or successive positions of the generatrices of the surfaces. Each of these threads has a weight suspended by it, so as always to make it a straight line. These weights are contained in boxes sustaining the directrices and their standards. The bars are movable in various directions, carrying with them the threads, still stretched straight by the weights in every position they may take; so that the forms and natures of the surface which they constitute are continually changing, while they always remain ruled surfaces. In this way a plane is transformed into a paraboloid, a cylinder into a hyperboloid, etc.

These models were invented by the late Theodore Olivier while Professor of Descriptive Geometry at the Conservatoire des Arts et Métiers, in Paris. One set of them is now deposited there, and a second is in the Conservatory of Madrid. Copies of some of them are to be found in most of the polytechnic schools of Germany. The Union College set is the original collection of the inventor, having been made in part by his own hands, and, after his death, in 1853, retained by his widow till bought of her by Professor Gillespie, in 1855. It is more complete than that in the Paris Conservatoire. It may be worth noticing that the silver plates on the boxes, reading *"Inventé par Théodore Olivier,"* etc., were added by Madame Olivier, at her own expense, after the purchase, as a tribute to the memory of her husband, her own words being, *"Je tenais à ce que chaque instrument portât le nom du savant dont la réputation passera à la postérité."*

Professor Bardin's (Paris) plaster models (seventy) of the INTERSECTIONS of prisms, pyramids, cylinders, cones, etc.

Schroeder's (Darmstadt) models (twenty) of elementary DESCRIPTIVE GEOMETRY. The planes of projection are in wood, and the lines and surfaces in metal; models illustrating Shades and Shadows.

Stone Cutting Models (twenty) in plaster, selected from those of L'Ecole Polytechnique of Paris.

Professor Bardin's models (ten) in plaster, of OBLIQUE ARCHES.

Groined and cloistered arch models (ten) in wood and plaster.

Models of structures in stone, consisting of bridges, culverts, etc.

Winding-stair models in wood and plaster. Full sized models of voussoirs and skew-backs of an oblique arch.

Models in Topography.—French and German plaster models, giving all the different forms of ground, accompanied by topographical drawings, showing how to represent these forms by contour lines, hatchings and shades from vertical and oblique light; models and maps in colored topography; a large model of Mount Cenis Pass, showing the wagon road and contour lines.

Architectural Models.—Models of the five orders of Architecture from L'Ecole des Beaux Arts, Paris; portals; stairs; roofs; walls; buttresses; domes, etc.

Engineering Models.—Schroeder's models of joints, brick bonds, etc.; spur wheels; bevel wheels; cranes; pile drivers; various forms of water-wheels; pumps; cylinders; valves; eccentrics, etc.; steam engines.

Casts of St. Venant's models, showing the changes of form in bodies subjected to flexure. Full sized model of the liquid vein measured by Poncelet and Lesbros.

Models of bridges of various systems, comprising truss, suspension, tubular and arch bridges; Doyne's Dynamometer Bridge Models, showing, by means of dynamometer, strains at different points; models of roof trusses, arranged for using the dynamometer to show the different stresses.

Models of fortifications, illustrating Vauban's system; shot, shell, etc.

Models of culverts, piers, abutments, culvert heads, wing walls, rail sections, etc.

Electrical Laboratory Equipment.

The equipment of the Electrical Engineering laboratory has been greatly augmented of late by a large amount of apparatus, a considerable portion being appropriated by the General Electric Company, and the laboratory has been extended to accommodate this apparatus.

The purpose of a college laboratory of Electrical Engineering is two-fold: To familiarize the student with the shape, appearance, relative proportions and construction of modern electrical apparatus, and to instruct him in the handling, assembling, testing and operation of electrical apparatus under normal and abnormal conditions.

Because of the great variety and large size of modern electrical apparatus, the former purpose can be fulfilled very incompletely only, even in the largest and best equipped college laboratories. Through the favorable disposition of the General Electric Company, by giving the Electrical Engineering students of Union Col-

lege free access to the works and testing rooms, this purpose is admirably fulfilled here, and by frequent and regular inspection trips to the Works and Testing Department of the General Electric Company under the direction of the college instructors, which trips constitute an integral part of the laboratory instruction, the students gain a very intimate knowledge of modern electrical apparatus of all types and sizes, not only when assembled and in operation and test, but also are enabled to observe their construction in the shops.

In equipping the college laboratory special consideration was therefore given to the selection only of such representative types of apparatus as can be handled, operated and tested by the students, and of a size sufficiently large to correspond to modern practice, but not so large as to make the operation under abnormal conditions—that is, under conditions which as a rule are specially instructive--unsafe for the apparatus. Entirely excluded from the laboratory equipment was all such machinery as the students could not be permitted to handle freely.

Three sources of power are provided: A direct connected unit, consisting of a Westinghouse gas engine and a Westinghouse direct current generator; connection with the 500-volt trolley circuit of the Schenectady Railway Company, and connection with the primary distributing mains of the 2,300-volt alternating current city circuit. In the latter case the voltage is reduced by banks of step-down transformers, so that the students can handle the safe low tension circuits only.

A very large number of various sizes of transformers are provided to give the students practical experience in connecting transformers for different ratios and for transformation between three-phase, quarter-phase, six-phase, etc., systems. The equipment further contains three-phase, quarter-phase and six-phase alternators and synchronous motors, the two characteristic types of induction motors, three and six-phase rotary converters, and numerous smaller induction motors, converters and direct current motors and generators of different types. A constant current arc machine, with different types of arc lamps and a constant alternating current transformer, with series arc lamps, a storage battery, testing tables, switchboards and numerous instruments of

the indicating and the integrating type are also provided for efficient instruction.

Power is distributed from a central switchboard to the various smaller machines in the Department, to the mechanical workshop provided for the students, and to the general lighting circuit of the building, and further extensions of the laboratory are under contemplation.

Physical Apparatus.

[See page 78.]

Mechanical Workshop, Carpenter Shop, Etc.

Under the direction of a first class machinist the students are instructed in the use of tools and machine-tools while fitting over and constructing new apparatus, to be used in the laboratory, etc. For this purpose a machine shop has been equipped with the following power-driven machine-tools: Two metal lathes, two milling machines, one drill press, one shaping machine (constructed in the college machine shop), one circular saw, one press shears for cutting sheet iron laminations. Besides these larger machines, the shops contain forge, anvil, vices and tools for all kinds of carpentry and mechanical work.

No attempt is made to give instruction in the regular manufacture of large machines, as the foundry, machine shops, smithy, etc., of the General Electric Company, which are among the largest and best equipped in this country, are open to the students for study and inspection at all times. Regular trips are made to the different departments of the works, under direction of college instructors, for the purpose of studying the mechanical features of the manufacture of electrical machinery. In this way the students obtain a knowledge of the difficulties to be met and overcome in the construction of large machines, which could never be obtained in a college workshop, alone, no matter how extensive the equipment.

Collections in the Department of Chemistry.

In Mineralogy.—The Wheatley collection contains nearly 4,000 specimens of minerals, the result of the labors of Charles

M. Wheatley. All of these have been labeled according to the nomenclature and order adopted by Dana. They are, without exception, open at all times to the students. They furnish an admirable means of practical illustration in Mineralogy. Among the rare and valuable specimens are those of Anglesite, Cerusite, Mimetite and Calcuprite, which in American specimens are equaled only by those in the British Museum. There are many fine specimens representing the noble metals from all parts of the world. There are few known species of minerals of which the collection does not contain some specimens.

In addition to this there is a large series of unlabeled specimens for crystallographic and blow-pipe examination.

In Metallurgy.—The College possesses a suite of ores of the useful metals, comprising over 1,000 specimens. These have been arranged to illustrate their mode of occurrence and geographical distribution. In addition are the fluxes, fuels, etc., used in obtaining the metals from the ores, together with the slags and metals themselves in various forms. There is a large number of models and drawings of stacks, furnaces, etc.; also suites of specimens of wood, charcoal, mineral coal, peat, etc., for physical inspection; also specimens of most of the useful alloys.

In Industrial Chemistry.—A large number of specimens of the materials used in the manufacture of the mineral and of some of the organic acids; the crude products themselves and the materials used in the manufacture of the alkalis, soaps, matches, black lead, candles, petroleum products; linseed, olive, castor, cottonseed and other oils; paper, porcelain, glass, fire and building brick, mortar and cements, beet and cane sugars, white lead and other paints, etc., etc.

Maps, Drawings, Etc.

This collection embraces a large number of maps, plates, profiles, topographical drawings and spherical projections; about fifty thousand engravings, lithographs, photographs and

detail drawings of engineering and architectural structures; working drawings of machines, bridges, buildings, etc.

Library.

The students have the use of the College and Society Libraries. The former contains the Engineering and Scientific Library of the late Professor Gillespie. See page 85.

Physiology and Physical Education.

[See page 84.]

For catalogue or special information regarding the Departments of Civil and Sanitary Engineering address

OLIN H. LANDRETH, Schenectady, N. Y.

For catalogue and special information regarding the Department of Electrical Engineering address

CHARLES P. STEINMETZ, Schenectady, N. Y.

COURSES OF STUDY

Leading to the Degree of B. E.

GENERAL ENGINEERING COURSE.

FRESHMAN YEAR.

[Alike for the General and Sanitary Engineering Courses.]

First Term.

Hours per week.

3 French.
3 German.
3 Freehand Drawing.
4 Algebra.
2 Rhetoric.
1 Physiology.
1 Experimental Physics.
1 Experimental Chemistry.
Lectures.

Second Term.

3 French.
3 German.
3 Analytic Geometry.
2 Mensuration.
3 Mechanical Drawing.
2 Rhetoric.
1 Experimental Physics.
1 Experimental Chemistry.
1 Gymnastics.
Lectures.

Third Term.

3 French.
3 German.
2 Rhetoric.
3 Analytic Geometry.
4 Surveying and Plotting.
1 Physiology.
1 Plane Trigonometry (Review).
1 Experimental Physics.
1 Experimental Chemistry.
Summer Vacation Work.

GENERAL ENGINEERING COURSE.

SOPHOMORE YEAR.

[Alike for the General and Sanitary Engineering Courses.]

First Term.

Hours per week.

5 Calculus.
5 Mechanics and Physics.
3 Chemistry.
3 English Literature.
1 Hygiene.
1 Rhetoric.

Second Term.

3 Calculus.
5 Mechanics and Physics.
2 English Literature.
3 Chemistry.
3 Descriptive Geometry.
1 Electrical Laboratory.
1 Rhetoric.

Third Term.

5 Physics.
3 Calculus.
3 Topographical Surveying.
3 Descriptive Geometry; Shades and Shadows.
3 Chemistry.
1 Electrical Laboratory.
1 Rhetoric.
Summer Vacation Work.

GENERAL ENGINEERING COURSE.

JUNIOR YEAR.

[Alike for the General and Sanitary Engineering Courses.]

First Term.

Hours per week.

5 Topographical Surveying.
4 Applied Mechanics.
3 Chemical Laboratory.
2 American History.
3 Highways.
1 Rhetoric.

Second Term.

5 Mechanics of Materials and Engineering Laboratory.
2 American History.
3 Kinematics and Machine Drawing.
2 Pavements.
1 Natural Perspective.
3 Spherical Trigonometry and Astronomy.
1 Rhetoric.

Third Term.

4 Stresses in Structures and Graphical Analysis.
3 Hydraulics.
2 Thermodynamics.
3 Route Surveying.
3 Mathematical Theory of Electricity.
2 American History.
1 Rhetoric.
Inspection Trips.
Summer Vacation Work.

GENERAL ENGINEERING COURSE.

SENIOR YEAR.

First Term.

Hours per week.

2 Motors and Motive Power.
4 Engineering Stresses.
3 Economics.
2 Stereotomy.
2 Outlines of Architecture.
2 Railroad Construction.
2 Economic Geology.
1 Rhetoric.
Inspection Trips.

Second Term.

3 Motors and Motive Power.
4 Engineering Design and Construction.
3 Water Supply Engineering.
2 Building Construction.
2 Method of Least Squares.
3 Sewerage.
1 Rhetoric.
Inspection Trips.

Third Term.

5 Engineering Design and Construction.
3 Engineering Law and Procedure.
4 Geodesy and Field Astronomy.
4 Electives.
Thesis.

SANITARY ENGINEERING COURSE

[The Freshman, Sophomore and Junior Years of this course re identical with those years of the General Engineering Course.]

SENIOR YEAR.

First Term.

Hours per week.

2 Motors and Motive Power.
4 Engineering Stresses.
3 Economics.
3 Heating and Ventilation.
3 Chemical Laboratory.
2 Economic Geology.
1 Rhetoric.
Inspection Trips.

Second Term.

3 Motors and Motive Power.
4 Engineering Design and Construction.
3 Water Supply Engineering.
2 Chemical Laboratory.
3 Sewerage.
2 Structural Botany.
1 Rhetoric.
Inspection Trips.

Third Term.

5 Engineering Design and Construction.
2 Sewage Disposal.
3 Engineering Law and Procedure.
3 Bacteriology.
1 Sanitary Codes and Laws.
1 House Drainage and Plumbing.
2 Electives.
Thesis.

ELECTRICAL ENGINEERING COURSE.

For the general plan of the course see page 144.

In 1902-3 the course was as follows:

FRESHMAN YEAR.

As in General Course, page 157.

SOPHOMORE YEAR.

As in General Course, page 158.

JUNIOR YEAR.

First Term.

Hours per week.

1 Mathematics.
4 Applied Mechanics.
3 Analytic Chemistry.
3 Hydraulics and Hydraulic Design.
2 Direct Current Circuit and Apparatus.
2 Direct Current Laboratory.
2 American History.
1 Rhetoric.
Lecture Course by Specialists.*
Inspection Trips.

Second Term.

1 Mathematics.
1 Natural Perspective.
2 Hydraulic Turbine.
4 Theory of Steam Engine.
2 Direct Current Circuit and Apparatus.
2 Altern. Current Circuit and Apparatus.
2 Electrical Laboratory.
2 American History.

2 Electrochemistry.
1 Rhetoric.
Lecture Course by Specialists.*
Inspection Trips.

Third Term.

1 Mathematics.
2 Elements of Civil Engineering.
4 Steam Engine Design.
2 Altern. Current Circuit and Apparatus.
2 Electrical Laboratory.
2 Electrical Apparatus Design.
2 Electric Lighting.
2 American History.
1 Rhetoric.
Lecture Course by Specialists.*
Inspection Trips.
Summer Vacation Work.

*See page 167.

ELECTRICAL ENGINEERING COURSE.

SENIOR YEAR.

First Term.

Hours per week.

3 Thermodynamics, Gas Engines and Steam Turbine.
2 Altern. Current Circuit and Apparatus.
2 Electrical Laboratory.
2 Electrical Apparatus Design.

3 Transmission and Distribution.
2 Modern Theory of Electrical Engineering.
3 Economics.
1 Technical French or German.
1 Rhetoric.
Lecture Course by Specialists.*
Inspection Trips.

Second Term.

3 Transmission and Distribution.
2 Altern. Current Circuit and Apparatus.
2 Electrical Laboratory.
3 Electrical Apparatus Design.
2 Electric Railway.
2 Electrochemistry.
3 Modern Theory of Electrical Engineering.
1 Technical French or German.
1 Rhetoric.
Lecture Course by Specialists.*

Third Term.

3 Electrical Apparatus Design.
3 Transmission and Distribution.
2 Electric Railway.
3 Modern Theory of Electrical Engineering.
3 Engineering Law and Procedure.
1 Technical French or German.
Thesis.
Lecture Course by Specialists.*
Inspection Trips.

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*See page 167.

ELECTRICAL ENGINEERING COURSE.

SPECIAL LECTURE COURSES.

In 1903 and 1904 non-students of Union University will be admitted as special students in the following courses of lectures, given to the Juniors and Seniors by or under the auspices of the Department of Electrical Engineering:

1. **Post-Graduate Lectures in Electrical Engineering.** By Dr. Charles P. Steinmetz, Prof. of Electrical Engineering.

   2 hours Wednesday evening, 7.30 to 9.30. Index to Lectures given below.

2. **General Lectures in Electrical Engineering.** By Specialists of the General Electric Co. and Dr. C. P. Steinmetz.

   2 hours Monday and Thursday evening, 8 to 9. Index to Lectures given below.

3. **Engineering Mathematics.** By Dr. Charles P. Steinmetz, Prof. of Electrical Engineering.

   1 hour Tuesday, 12 to 1 P. M.

4. **Electrochemistry.** By C. A. Ernst, Ph. D., Assistant Director Electrochemical Research Lab., Gen. Elect. Co.
   2 hours Tuesday and Friday, 5 to 6 P. M.

5. **Technical German.** By R. Neil Williams, Asst. Prof. of Electrical Engineering.

INDEX TO COURSE I.

By Dr. C. P. Steinmetz.

(A fair knowledge of mathematics and familiarity with electrical engineering is desirable.)

1. Review: The Electric, Magnetic and Dielectric Circuit. Resistance, Inductance, Capacity and Wireless Telegraphy.

2. The Law of Electromagnetic Induction; Electric Apparatus and Machines.

3. The Characteristic Curves of Electrical Apparatus, Machines and Circuits. Magnetic Characteristic: Saturation and Excitation Curve. Load Characteristic: Regulation Curve, Field Characteristic, Compounding Curve. Phase Characteristic of Alternating Current Apparatus: Efficiency, No Load and Load Losses.

4. Commutating Machines, Direct Current Generators and Motors.

5. Synchronous Machines: Alternators and Synchronous Motors and Converters.

6. Induction Machines: Induction Motors and Generators, Single Phase and Polyphase Repulsion Motors and Generators.

7. Rectifying Machines: The Arc Machine. Constant Potential and Constant Current Rectification.

8. Transformers and Reactors: Constant Potential and Constant Current.

9. Meters: Indicating, Integrating and Recording.

10. Transient Phenomena: Starting and Building up of Direct Current Generators; Effect of Field Inductance and Fluctuating Load. Starting of Synchronous Machines.

11. Starting of Transformers, of Inductive Circuits, of Circuits Containing Inductance and Capacity, Transmission Lines. Short Circuit Phenomena of Circuits Containing Inductance and Capacity. Transmission Lines, Short Circuit Oscillations.

12. Short Circuit Current of Direct and Alternating Current Generators.

13. Hunting or Surging of Synchronous Machines, Motors and Converters. Hunting or Surging of Induction Machines, of Direct Current Motors and Generators.

INDEX TO COURSE II.

By Specialists and Dr. C. P. Steinmetz.

Introductory.....Dr. C. P. Steinmetz

Magnetism and Induced Electricity.....R. Neil Williams

Graphite: Its Mechanical and Electrical Uses.....C. T. Coley

Power Factor of Direct Current Machines.....J. C. Parker

Historical Development.....W. S. Andrews

D. C. Commutating Machines.....H. F. T. Erben

Calculation and Design of D. C. Commutating Machines.
W. F. Dawson

Boosters and Variable Speed Motors.....H. Bickerstaff

Electrical Calculation of A. C. Generators and Syn. Motors.
W. J. Foster

Electric Calculation of Induction Motors.....A. E. Averett

Mechanical Design of Gen. and Syn. Motors.....H. G. Reist

Mechanical Design of Induction Motors.....H. G. Reist

General Transformer, Generators, Boosters, Frequency Converters, etc.....Dr. C. P. Steinmetz

A. C. Transformer.....W. S. Moody

Potential Regulators.....E. F. Gehrkens

Constant Current Transformers.....M. O. Troy

Reactors .....J. J. Frank

Converters and Double Current Generators.....L. F. Deming

Syn. Motor, Converter, Ind. Motor, Sphere of Application.
Dr. C. P. Steinmetz

Systems of A. C. and D. C. Distribution.....W. L. R. Emmet

Parallel Operation of A. C. Generators and Motors.
W. I. Slichter

Phase Control of Long Distance Transmission Lines by Synchronous Motors and Converters, Elementary Calculation ..... Dr. C. P. Steinmetz

Long Distance Transmission..C. C. Chesney, of Stanley Works

Modern 60,000-Volt Installations..... P. T. Hanscom

Design of High Voltage, Large Power Systems..... T. H. Soren

Elementary Theory of Distributed Capacity, Resistance and Inductance. High Voltage Oscillations and Surges. Dr. C. P. Steinmetz

Theory of Electric Instruments..... C. D. Haskins

Switches, Circuit Breakers and Control of Distributing Systems ..... E. M. Hewlett

Lightning and Lightning Protection, with Experiments. Dr. C. P. Steinmetz

City and Interurban Railways..... W. J. Davis, Jr.

Rapid Transit and Acceleration. High Speed Trunk. A. H. Armstrong

Railway Transmission and Control..... J. E. Woodbridge

Repulsion Machines..... W. I. Slichter

The Carbon Arc, Arc Lamps and Arc Light Machinery, with Experiments..... Dr. C. P. Steinmetz

Vacuum Tube Phenomena, X-Rays, Ultraviolet Light. W. S. Andrews

Thermodynamics ..... Dr. Weintraub

Photometry and Distribution..... J. C. Parker

Storage Battery..... A. H. Armstrong

Electrolysis; General Principles..... Dr. W. R. Whitney

Electrical Equipment of Warships..... Maxwell Day

Principles of Polyphase Circuits and Apparatus. Dr. C. P. Steinmetz

Industrial Electrochemistry..... Dr. C. A. Ernst

Steam Turbines.....A. H. KRUESI
Induction Motors.....K. A. PAULY
Switchboard Design.....A. S. LOIZEAUX
Application of Motors to Machine Tools.....H. B. EMMERSON
Transformer Testing.....E. L. SIMPSON
A. C. Armature Winding.....H. G. REIST
High Potential Cables.....W. S. CLARK

INDEX TO COURSE III.

ENGINEERING MATHEMATICS.—JUNIOR COURSE.

By DR. C. P. STEINMETZ.

(Some Algebra, Analytic Geometry and Calculus are desirable.)

1. The Infinite Series, its Derivation and its Meaning.

2. The Trigonometric Series.

3. The Determination of Maxima and Minima.

4. The Fundamental Differential Equation of Electrical Engineering and its Integral.

5. Empirical Curves and Their Investigation. The Potential Series, or Parabolic, Exponential or Logarithmic Function.

ALBANY MEDICAL COLLEGE

MEDICAL DEPARTMENT OF

UNION UNIVERSITY

SEVENTY-THIRD SESSION

ALBANY MEDICAL COLLEGE.

The Medical College building, situated on Eagle street, Albany, is well appointed in its lecture rooms, laboratories, dissecting room and museums. The chemical laboratory is fitted with every requisite for the illustration of the lectures and the use of students, while the Bender Hygienic Laboratory furnishes unexcelled facilities for instruction in histology, pathology, bacteriology and clinical microscopy.

The location of the college is such as to afford superior advantages to the student. The hospitals and dispensaries furnish an abundant supply of material for the illustration of clinical medicine and surgery, while the museums are especially rich in anatomical and pathological preparations.

With the session of 1897-'98 a four-year course was inaugurated, and four courses are now required by law in this state. The curriculum embraces lectures by professors and lecturers; recitations conducted mainly by instructors, and practical demonstrations, clinical teaching and laboratory work, in which the professors in the different departments are assisted by clinical assistants and demonstrators.

The Albany Hospital, St. Peter's Hospital, Child's Hospital, St. Margaret's House, Albany's Hospital for Incurables, County Hospital, South End Dispensary, Eye and Ear Infirmary, and dispensaries connected with each are, by the regulations of their governing boards, made available for clinical purposes to the students.

Appointments to positions on the house staffs of the Albany Hospital, and other hospitals in Albany and neighboring places, are annually made, and are competed for by the members of the graduating class.

TRUSTEES

WILLIAM L. LEARNED,
President.

SIMON W. ROSENDALE,
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WILLIAM J. WALKER,
ALDEN CHESTER,
EDWARD BOWDITCH,
GEORGE P. HILTON,
FREDERIC TOWNSEND.

MAYOR OF ALBANY,
RECORDER OF ALBANY, } *Ex-Officio.*

CATALOGUES are sent with care, and graduates of the college changing their post-office address, or not receiving them, will please notify

WILLIS G. TUCKER, M. D., *Registrar,*
Albany Medical College,
Albany, N. Y.

FACULTY.

ANDREW VAN VRANKEN RAYMOND, D. D., LL. D.,
Chancellor of the University.

ALBERT VANDER VEER, M. D., PH. D., DEAN,
Professor of Surgery.

JOHN MILTON BIGELOW, M. D., PH. D.,
Emeritus Professor of Materia Medica, Therapeutics and Diseases of the Throat and Nose.

SAMUEL BALDWIN WARD, M. D., PH. D.,
Professor of Theory and Practice of Medicine and of Hygiene.

JAMES PETER BOYD, M. D.,
Professor of Obstetrics, Gynecology and Diseases of Children.

WILLIS GAYLORD TUCKER, M. D., PH. D., REGISTRAR,
Professor of Chemistry and Toxicology.

WILLIAM HAILES, M. D.,
Anthony Professor of Pathological Anatomy, Histology and Fractures and Dislocations.

CYRUS STRONG MERRILL, M. D.,
Professor of Ophthalmology and Otology.

FREDERIC COLTON CURTIS, M. D.,
Professor of Dermatology.

HENRY HUN, M. D.,
Professor of Diseases of the Nervous System.

SAMUEL ROSEBURGH MORROW, M. D.,
Professor of Practice of Surgery and of Orthopedic Surgery.

HERMON CAMP GORDINIER, M. D.,
Professor of Physiology.

HOWARD VAN RENSSELAER, M. D.,
Professor of Materia Medica and Therapeutics, and Adjunct Professor of Theory and Practice of Medicine.

JOSEPH DAVIS CRAIG, M. D.,
Professor of Anatomy, and Curator of the Museum.

WILLIS GOSS MACDONALD, M. D.,
Professor of Abdominal and Clinical Surgery.

Adjunct Professors.

ANDREW MacFARLANE, M. D.,
Medical Jurisprudence and Physical Diagnosis.

RICHARD MILLS PEARCE, M. D.,
Pathology and Bacteriology.

Clinical Professors.

HERMAN BENDELL, M. D.,
Otology.

ARTHUR GUERNSEY ROOT, M. D.,
Diseases of the Throat and Nose.

LEO HAENDEL NEUMAN, M. D.,
Theory and Practice of Medicine and Gastro-Enteric Diseases.

JESSE MONTGOMERY MOSHER, M. D.,
Insanity, Neurology and Electro-Therapeutics.

Lecturers.

WILLIAM OLIN STILLMAN, M. D.,
History of Medicine.

HARRY JUDSON LIPES, M. D.,
Obstetrics.

CHARLES HARPER RICHARDSON, M. D.,
Minor Surgery.

ARTHUR WELLS ELTING, M. D.,
Surgical Pathology.

GEORGE EMORY LOCHNER, M. D.,
Gynecology.

ARTHUR TURNER LAIRD, M. D.,
Clinical Microscopy.

THEODORE JAMES BRADLEY, PH. G.,
Inorganic Chemistry.

SPENCER LYMAN DAWES, M. D.,
Materia Medica, and Instructor in Theory and Practice of Medicine.

CHARLES HENRY MOORE, M. D.,
Ophthalmology and Otology.

CLEMENT FRANK THEISEN, M. D.,
Diseases of Throat and Nose.

ARTHUR SAUTTER, M. D.,
Dermatology and Genito-Urinary Diseases.

HENRY LARNED KEITH SHAW, M. D.,
Diseases of Children.

HERBERT DODGE PEASE, M. D.,
Antitoxins and Immunity.

Instructors.

THOMAS WILLIAMS JENKINS, M. D.,
Anatomy and Pathological Anatomy.

WILFRED SILVESTER HALE, M. D.,
Anatomy, and Demonstrator of Anatomy.

ALVAH HARRY TRAVER, M. D.,
Surgery, and Assistant Demonstrator of Anatomy.

EDGAR ROSCOE STILLMAN, M. D.,
Physiology.

EDGAR ALBERT VANDER VEER, M. D.,
Surgery.

EUGENE EUNSON HINMAN, M. D.,
Anatomy, and Assistant Demonstrator of Anatomy.

EDWARD WATERBURY BECKER, M. D.,
Physiology.

CHRISTIAN GOTTLIEB HACKER, M. D.,
Materia Medica and Therapeutics.

HARRY WARDELL CAREY, M. D.,
Surgical Pathology.

LEO FRANK ADT, M. D.,
Ophthalmology.

EDWARD GERALD GRIFFIN, M. D.,
Therapeutics.

JAMES FRANCIS ROONEY, M. D.,
Theory and Practice of Medicine.

JAMES WESLEY WILTSE, M. D.,
Dermatology and Genito-Urinary Diseases.

HOWARD EATON LOMAX, M. D.,
Anatomy.

Clinical Assistants.

WILLIAM HENRY GEORGE, M. D.,
MICHAEL DANIEL STEVENSON, M. D.,
WASHINGTON IRVING GOEWEY, M. D.,
ELIJAH HUDSON RIDER, M. D.,
WILLIAM GRANT LEWI, M. D.,
MARTIN MACHARG, M. D.,
LOUIS LEBRUN, M. D.,
THOMAS ADDIS RYAN, M. D.,
JAMES MANNING MOORE, M. D.,
WILLIAM PITNEY BRIERLEY, M. D.,
JOSEPH ALOYSIUS LANAHAN, M. D.,
JOSEPH PATRICK O'BRIEN, M. D.,
ADAM JAMES BLESSING, M. D.,
ANNE TEFFT BINGHAM, M. D.,
MARY FRANCES SWEET, M. D.

CALENDAR, 1904-1905.

1904.

Regular winter session begins.....Tuesday, September 27.
Thanksgiving vacation begins.....Wednesday, November 23.
Lectures resumed .....Monday, November 28.
Christmas vacation begins.....Friday, December 23.

1905.

Lectures resumed .....Monday, January 2.
Commencement .....Tuesday, May 8.

PRELIMINARY EXAMINATION.—The preliminary examination of medical students is under the control of the Board of Regents of the University of the State of New York. Those contemplating the study of medicine should apply to the High School Department, University State of New York, Albany, by letter or otherwise, if information concerning this examination further than that given in the catalogue of the Medical College is desired. One of the examinations will be held in Albany, September 27-30, 1904.

MID-WINTER WRITTEN EXAMINATIONS in all the departments are held before the Christmas vacation. A printed schedule of these examinations is furnished the class.

Course of Instruction.

The four years' graded course required of all candidates for the degree of Doctor of Medicine embraces the following subjects:

First Year.

1. **Anatomy**—three lectures; six hours osteology and dissection. 2. **Inorganic Chemistry**—three lectures; four hours laboratory; one recitation. 3. **Physiology**—two lectures; one recitation; two demonstrations. 4. **Histology**—five hours laboratory; one recitation. 5. **Materia Medica**—three lectures; two recitations.

Lectures, 11; laboratory, 9 hours; dissection and demonstrations, 8 hours; recitations, 5.

Second Year.

1. **Anatomy**—three lectures; eight hours dissection and demonstration; two recitations. 2. **Organic Chemistry and Toxicology**—three lectures; one recitation. 3. **Hygiene**—one lecture. 4. **Physiology**—two lectures; one recitation. 5. **Therapeutics**—one lecture; one recitation. 6. **Theory and Practice**—two lectures; one recitation. 7. **Surgery (minor)**—one lecture; one demonstration. 8. **Bacteriology and Pathology**—one lecture; seven and a half hours laboratory. 9. **Clinics**—two hours surgical.

Lectures, 14; dissections and demonstrations, 9 hours; laboratory, 7½ hours; recitations, 6; clinics, 2.

Third Year.

1. **Theory and Practice**—four lectures; two recitations. 2. **Clinical Microscopy**—two and a half hours laboratory. 3. **Therapeutics**—two lectures. 4. **Electro-therapeutics**—one lecture half the term. 5. **Obstetrics**—two recitations. 6. **Pediatrics**—one lecture; one recitation half the term. 7. **Neurology**—one lecture; one recitation half the term; one clinic. 8. **Surgery (pathology, operative, fractures, dislocations)**—six lectures; two and a half hours demonstration; two recitations. 9. **Physical Diagnosis and Ophthalmology**—section work, two hours. 10. **History of Medicine**—one lecture half the term. 11. **Conference**—one medical. 12. **Clinics**—two hours medical; three surgical.

Lectures, 15; laboratory, 2½ hours; demonstrations, 2½ hours; conference, 1; recitations, 7; section work, 2; clinics, 6.

Fourth Year.

1. **Theory and Practice**—three lectures; one recitation. 2. **Neurology**—one lecture; one clinic. 3. **Gynecology**—one lecture. 4. **Obstetrics**—one lecture; one recitation. 5. **Surgery (including Orthopedics)**—three lectures; one recitation. 6. **Medical Jurisprudence**—one lecture, half the term. 7. **Specialties**—one recitation. 8. **Conferences**—one medical; one surgical. 9.

Clinics—two hours medical, three surgical. 10. **Clinical Section Work**—thirteen hours.

Lectures, 10; recitations, 4; conferences, 2; clinics, 6; clinical section work, 13 hours.

The order of instruction for the ensuing session will be found in the catalogue of the Medical College, and may be obtained by application to the Registrar.

Laboratories.

Practical Chemistry.—The chemical laboratory is well furnished and conveniently arranged, each student having a desk and reagents for his own use, and being supplied with all necessary apparatus. The laboratory course is preceded, since although some knowledge of chemistry is highly desirable, none is now *required* at entrance, by a series of lessons upon chemical nomenclature, notation and the essential principles of theoretical chemistry, including the laws of combination and valence, and these subjects are therefore more briefly treated in the regular lecture course. The practical laboratory work includes tests for those metals and acids which, in combination, are important as constituents of medicinal compounds or as poisons, together with the separation of the chief groups and the examination of unknown substances. The more important toxicological and urinary tests are performed and all chemical reactions are written upon the blackboard, discussed by the class, and entered upon their notes.

Histology, Pathology, Bacteriology and Clinical Microscopy.

Work in these departments is carried on in the Bender Hygienic Laboratory, on Lake Avenue, near the Albany Hospital.

This building was erected by Mr. Matthew W. Bender, of Albany, and is thoroughly equipped with the apparatus necessary for the study of histology, pathology, bacteriology and clinical microscopy. Practical work in these branches is obligatory upon all students, and abundant opportunity is furnished in the laboratory for acquiring a thorough knowledge of these important subjects.

In histology the work consists of explanatory talks on the subject of the day's study, followed by microscopic study of sections, each student being required to make drawings of his sections. The different tissues and organs of the body are taken up systematically.

In bacteriology the work consists of lectures, followed by practical laboratory exercises. It is intended to render the student familiar with the underlying principles of bacteriology, and their application to clinical medicine and surgery.

In pathology the work consists of a short lecture on the subject for the day, followed by practical exercises in mounting, staining and examining sections. Students make drawings of their sections. They are instructed in the technique of making autopsies, and material from autopsies and surgical operations is demonstrated to them as available.

In clinical microscopy the course consists of practical work in the examination of blood, urine, sputum, fæces, etc.

A limited number of students who have shown proper aptitude will be allowed to work along more advanced lines during the summer months.

For the Alumni of this school, and for physicians in the vicinity, this laboratory offers excellent facilities for the examination of urine, sputum, pathological specimens and blood. Information regarding such examinations may be obtained by communicating with Dr. Richard M. Pearce, Director.

Practical Clinical Courses.

In order to familiarize students with the practical work of their profession, and to bring them into closer personal contact with patients, the fourth year class is divided into sections of eight or ten men, and on four days in each week each man devotes several hours to the examination and personal observation, under the supervision of the instructors, of patients in the wards and outpatient departments of the various hospitals and dispensaries. In this clinical work especial attention is devoted to the complete examination of the blood, urine, sputum and stomach contents, as well as to the special examination of the eye, ear and other organs. Thus in the course of the school year the men in each

section acquire practical knowledge and technical diagnostic dexterity in general medicine, general surgery, dermatology, neurology, insanity, otology, laryngology, ophthalmology, rhinology, diseases of children and infants, infant feeding, diseases of the rectum and genito-urinary tract, operative surgery, orthopedic surgery, operative obstetrics, electro-therapeutics and medical technique.

Fees and Expenses.

Fees, excepting the final examination fee, are payable in advance, are not returnable, and are as follows:

FIRST YEAR.

Matriculation	$ 5 00
Lecture Course	100 00
Chemical Laboratory	10 00
Histological Laboratory	10 00
Dissection (including material)	5 00
	$130 00

SECOND YEAR.

Matriculation	$ 5 00
Dissection	10 00
Lecture Course	100 00
Bacteriological and Pathological Laboratory	15 00
	$130 00

THIRD YEAR.

Matriculation	$ 5 00
Lecture Course	100 00
Clinical Microscopy Laboratory	5 00
	$110 00

FOURTH YEAR.

Matriculation	$ 5 00
Lecture Course	100 00
Final Examination	25 00
	$130 00

The payment of three hundred dollars in advance entitles to attendance upon four courses of lectures, exclusive of laboratory and other special fees above stated, and effects a saving of one hundred dollars on the cost of the four-year course. The final examination fee must be paid before the examinations begin. Graduates of the school may attend lectures and stated clinics without charge, except for matriculation in case of prolonged attendance.

The cost of living in Albany is less than in most other cities of its size. The janitor of the college keeps a list of boarding houses at which good rooms and board can be obtained at from four to five dollars a week or upwards, and by clubbing together students can live comfortably at still lower rates.

Requirements for Graduation.

The candidate must be twenty-one years of age, and exhibit a certificate from a physician or surgeon, duly authorized by law to practice his profession, that he has studied medicine and surgery under his instruction during the period required by law in this state, and he must present evidence of having complied with the law concerning preliminary examination.

He must have attended not less than four regular courses of lectures, of which the last shall have been at this college. Students who have attended one or more courses of lectures at other recognized medical colleges, who may desire to be admitted to advanced standing in this college, will be credited with the work they may have done and with examinations they may have passed, other than those of the senior year, if satisfactory evidence of such attendance and of the passing of such examinations is presented.

He must be of good moral character.

He must maintain a satisfactory standing during his course and pass a satisfactory final examination in the several branches taught.

Regular and punctual attendance is required, and matriculation tickets are endorsed with attendance at the end of the term.

For catalogues or further information, address

WILLIS G. TUCKER, M. D., *Registrar.*

Albany, N. Y.

January 1, 1904.

ALBANY LAW SCHOOL

LAW DEPARTMENT

UNION UNIVERSITY

FIFTY-FOURTH YEAR

1904-1905

ALBANY LAW SCHOOL.

This School is among the oldest institutions of the kind in the country, having been established in 1851, and its graduates number many of the most successful men in the profession. The school is and has been largely represented in the Executive, Judicial and Legislative departments of this and many other States, as well as of the federal government.

It became a part of Union University in 1873, and begins its fifty-fourth year as a law school with the present scholastic year. During its long and successful career it has, in common with other law schools, done much to demonstrate what was at one time doubtful, but is now accepted almost as an axiom, that a course at the law school is a well-nigh necessary prerequisite to a successful professional career. Its instructors have always been men of repute and standing, both for professional learning and personal character.

Local Advantages.

The local advantages of the city of Albany, as the seat of a professional school, can not be overrated. It is the capital of one of the leading States in the Union, whose legislature is in session here for the third part of the year, presenting opportunities not afforded by any other Law School in the State for observing the methods and procedure collectively of the executive, judicial and legislative departments of the State government. The knowledge thus obtained by the students at law, who are to complete their course and to enter the realm of public affairs, can not be overestimated.

It is easily accessible, remarkably healthful, and the scene of great business and professional activity. It is large enough to afford its inhabitants all the means of culture and recreation naturally to be looked for in a city, while it is not so large as to make the cost of living burdensome, even to persons of extremely limited means.

Facilities for Study.

The facilities afforded the students for reading and study are unsurpassed.

Besides the convenient and well chosen library of the school accessible to the students at all hours of the day and evening, the students have the privilege of using the State Law Library, the most extensive and best selected in the United States, consisting of 65,000 volumes or more.

With free access to these libraries the student may be relieved to a great extent from purchasing text-books.

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International Law.

Special Lecturers.

The list of special lecturers is a notable one, including the Chief Judge and an Associate Judge of the Court of Appeals, two Justices of the Supreme Court and a former Attorney-General.

Hubbard Chair of Legal Ethics.

The circulars of seventy of the leading Law Schools of the country show that only twenty of this number make the subject of Legal Ethics part of their curriculum. With two exceptions, those schools are either in the West or South. These facts led Gen. Thomas H. Hubbard, class of '60, to place at the disposal of the Board of Trustees the sum of $10,000, the income to be applied to lectures upon this subject. The Board of Trustees decided to inaugurate the course at the opening of the school year of 1903. Gen. Hubbard, the founder of the chair, delivered the

opening lecture, and will be followed during the academic year by Justice David J. Brewer of the Supreme Court of the United States, Judge Irving G. Vann of the Court of Appeals and Judge Simeon E. Baldwin of the Supreme Court of Connecticut.

Academic Year.

The full academic course leading to the degree of LL. B. is two years, divided into two semesters each. The graduating course, preceded by one or two years in a law office, is one year. This does not entitle a student to a Degree.

Requirements for Admission to Junior Class.

The full course for study consists of two scholastic years. Any student who has conformed to the requirements of the Regents as to general education, or satisfies the Faculty that he will so conform to such requirements within the year allowed by the Regents for that purpose, after commencing the study of law, may enter the Junior class, and upon completion of the two years course and passing the required examination will be graduated with the degree of LL. B.

College graduates will find this course well adapted to the requirements of the Court of Appeals, requiring them to study law two calendar years after graduation. They can enter the school upon presentation of their certificate of graduation, without examination, attend the full course of two years, of not less than eight months each, receive the degree of LL. B., and take the bar examination in June following their graduation at the school.

Requirements for Admission to Senior Class.

Any student not a college graduate who has completed two years of required legal study, after conforming with the requirements of the Regents as to general education, or any college graduate who has completed one year of such study after graduation, and any student presenting a certificate that he has satisfactorily completed one year of study at a law school of recognized standard, will be admitted to the Senior class without ex-

amination upon production of the Regents' and clerk's certificates, and will be graduated in the same manner as students have heretofore been graduated in the one year course, and will receive a certificate for the time spent at the school; but the degree of LL. B. will be conferred only upon students who have completed the entire course of two years at a law school.

Requirements for Graduation.

Candidates for graduation not candidates for the degree of LL. B. must have attended one year of not less than eight months, after one or two calendar years of ten months each of legal study, or have passed in the work of the Junior year, and must have passed in all examinations and conformed to all the requirements as stated above.

Tuition.

The fees for tuition are payable in advance, as follows: For the full course of one year tuition, $100; matriculation fee, $10; diploma fee, $5; or $60 for the first semester and $55 for the second. For the full course of two years and degree of LL. B., tuition $100 each year; matriculation fee, $10; degree, $5; or $60 for the first semester and $50 for each semester thereafter, except the last, which will be $55.

For catalogues or further information address.

ALBANY LAW SCHOOL, ALBANY, N. Y.

W. R. Davidson, Secretary.

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THE DUDLEY OBSERVATORY.

The Dudley Observatory is located on Lake Avenue, in the southwestern part of Albany, to which site it was removed in 1893 from its former location in the northern part of Albany. It is devoted to original researches in astronomy, according to the purpose of its founders and successive patrons. Its contributions to science are represented in two volumes of "Annals," and in other published volumes and memoirs contained in the transactions of learned societies and astronomical journals. Its principal line of work at the present time is the determination of problems relating to the positions and motions of the stars and of the solar system as a whole. The staff consists of the director, two assistants, and several computers.

The instrumental equipment of the Observatory is designed for the purposes of exact measurement in line with its chosen work. In the tower of the main building is the Pruyn Equatorial, with object-glass twelve inches in diameter. This instrument is equipped both for visual and photographic use, and is of a high order of mechanical perfection. The Olcott Meridian Circle is located in a separate building, especially designed for securing the utmost equality in the temperature between the external air and that in the building itself. Its object-glass is eight inches in diameter. It was made by Pistor and Martins, of Berlin, and is regarded by astronomers as a masterpiece of accurate workmanship. This instrument has been employed for many years in obtaining the measurements necessary for the construction of the numerous and elaborate star catalogues which have issued from the Dudley Observatory.

In addition to these instruments, the observatory is in possession of various small telescopes, clocks, chronographs and smaller apparatus.

The institution is supported by an endowment, chiefly contributed by Mrs. Blandina Dudley and the late Catharine W. Bruce; as well as by appropriations which have been received from the

National Academy of Sciences, and from current contributions of trustees and friends of the institution.

The Dudley Observatory is not designed to give general instruction in Astronomy, though special students contemplating instruction in professional lines have been received from time to time under an arrangement of computing service to the observatory.

The observatory is opened to visitors on Tuesday evening of each week from 8 to 10 o'clock.

For further particulars apply to

LEWIS BOSS,

Director.

ALBANY COLLEGE OF PHARMACY

DEPARTMENT OF PHARMACY OF

UNION UNIVERSITY

ALBANY COLLEGE OF PHARMACY.

The Albany College of Pharmacy was created by act of the Board of Governors of Union University, June 11, 1881, and constitutes the *Department of Pharmacy of Union University.* It was incorporated as the "Albany College of Pharmacy," August 27, 1881.

The exercises of the college are held in the Albany Medical College building, on Eagle street, distant but a block from the Capitol, and in the pharmaceutical laboratory on Maiden Lane. The lecture rooms and laboratories are perfectly adapted to the needs of the college and furnish to the faculty excellent facilities for imparting instruction. The lectures are delivered in the chemical lecture room on the first floor, adjoining which is the large and well fitted chemical laboratory, where instruction is given to the classes in practical chemistry. The collections in the different departments are very complete and afford the professors ample facilities for the illustration of the lectures.

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Instructor in Microscopy, Materia Medica and Pharmacognosy.

EDWIN CUNNINGHAM HUTMAN, PH. G.,
Director of Pharmaceutical Laboratory.

Calendar for 1904-1905.

1904.

Introductory lecture, Monday, October 3.

Election vacation, Monday and Tuesday, November 7 and 8.

Thanksgiving vacation begins Wednesday, November 23.

Lectures resumed Monday, November 28.

Christmas vacation begins Friday, December 23

1905.

Lectures resumed Wednesday, January 4.

Commencement, Tuesday, March 28.

Entrance Requirements.

All applicants for admission to regular standing in this college will be required to pass a preliminary examination or present a grammar school certificate entitling the holder to enter a high school, or satisfactory written evidence of an equivalent preliminary education. The examination of those who cannot present such evidence is held at the opening of the session. A knowledge of Arithmetic, Geography and Grammar, as far as is taught in the grammar schools of this state, and entitling the possessor to enter a high school of the state, will be required.

The Curriculum

of the college embraces—

Chemistry—Theoretical, General, Pharmaceutical and Analytical.

Botany—Structural, Systematic and Analytical.

Materia Medica and Pharmacognosy.

Pharmacy—Theoretical and practical.

Microscopy—Theoretical and practical in its relations to Pharmacy.

Physics and Pharmaceutical Mathematics.

Requirements for Graduation.

The diploma of this college confers the degree of GRADUATE IN PHARMACY (Ph. G.). Applicants for this degree must be at least twenty-one years of age, of good moral character, have attended two full courses of lectures (which shall have included all laboratory practice) in this college, or the last course in this college and the first in some other college of pharmacy; have had, inclusive of the time of attendance at this college, four years' practical experience with some reputable and competent pharmacist; have passed a satisfactory examination and paid all fees as hereafter stated. Experience in wholesale stores cannot be taken in lieu of the practical experience in a retail pharmacy.

Fees for Tuition.

FIRST YEAR.

Matriculation	$ 3 00
Lecture tickets	30 00
Chemical laboratory	15 00
Pharmaceutical laboratory	15 00
Recitations	5 00

SECOND YEAR.

Lecture tickets	$30 00
Pharmaceutical laboratory	15 00
Microscopical laboratory	10 00
Recitations	5 00
Graduating fee	10 00

Students who have attended two full courses of lectures at this college may attend further courses without extra charge. Payment of Laboratory and Recitation Fees will, however, be required, should the courses be taken.

Situations.

Students desirous of obtaining employment will be assisted so far as possible in securing situations, but employment cannot be promised in advance, and places cannot be secured by correspondence. Desirable situations have been obtained for many applicants, and graduates of the college are in constant demand. During the past year the faculty has had a much larger number of openings offered for graduates to lucrative positions than it has been able to supply. The demand on the part of the employers for skilled assistants is steadily increasing, and a college diploma or license from an examining board is demanded by law of those who engage in the practice of pharmacy in most of the states and cities of the Union.

For annual catalogue giving more complete information address

THEODORE J. BRADLEY, Ph. G., Secretary,

4 Lancaster Street, Albany, N. Y.

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OF

UNION UNIVERSITY

1904–1905

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1904–1905

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COLLEGE CALENDAR FOR 1905

	S	M	T	W	T	F	S
Jan.	1	2	**3**	**4**	**5**	**6**	7
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	10	**11**	**12**	**13**	**14**	**15**	16
	17	**18**	**19**	**20**	**21**	**22**	23
	24	25	26	27	28	29	30
	31	...	...	...	...	...	..

Figures in heavy type indicate days on which Union College is in session.

UNIVERSITY CALENDAR

1905.

3 Jan.	Registration Day for Students, Winter term, Union College.
4 Jan.	Winter term of Medical College resumes.
4 Jan.	Recitations begin, Union College.
26 Jan.	Day of Prayer for Colleges.
27 Jan.	First semester of Law School ends.
31 Jan.	Second semester of Law School begins.
10 Feb.	Allison-Foote Prize Debate between the Literary Societies.
22 Feb.	Washington's Birthday.
4 March	Examination for conditioned students.
24 March	Winter term of Union College ends.
27 March	Registration Day for Students, Spring term, Union College.
28 March	Recitations begin, Union College.
28 March	Commencement of the College of Pharmacy.
15 April	Selection of Junior and Sophomore prize orators.
21-24 April	Easter Recess, Union College.
2 May	Commencement of the Medical College.
6 May	Examination for conditioned students.
15 May	Date for presentation of prize essays.
30 May	Memorial Day.
31 May	Commencement of Law School.
2 June	Senior Examinations end.
11 June	Sunday. Baccalaureate Sermon, Union College.
12 June	Prize Contest in Extemporaneous Speaking, and Prize Oratory of Juniors and Sophomores.
13 June	Meeting of Trustees, Phi Beta Kappa, Sigma Xi. Alumni.
14 June	Commencement of Union College, the second Wednesday in June, President's reception.

University Calendar—Continued

1905.

15, 16 June	Entrance examinations, Union College.
18 Sept.	Registration Day for Freshmen, Union College.
20 Sept.	Registration Day for Students other than Freshmen, Union College. Entrance Examinations, Union College.
21 Sept.	First Chapel Exercises and Recitations, Entrance Examinations concluded.
22 Sept.	Freshman Recitations begin.
23 Sept.	Examination for conditioned students.
26 Sept.	Registration Day, Law School.
26 Sept.	Winter term of Medical College begins.
27 Sept.	Law School begins.
2 Oct.	The College of Pharmacy begins.
7 Nov.	Election Day.
30 Nov.	Thanksgiving Day. Recess four days.
2 Dec.	Examination for conditional students.
22 Dec.	Fall term of Union College ends.

1906.

2 Jan.	Registration Day for Students, Winter term, Union College.
3 Jan.	Winter term of Medical College resumes.
3 Jan.	Recitations begin, Union College.
3 Jan.	Winter term of College of Pharmacy resumes.
25 Jan.	Day of Prayer for Colleges.
17 Feb.	Allison-Foote Prize Debate between the Literary Societies.
22 Feb.	Washington's Birthday.
3 March	Examination for conditioned students.
23 March	Winter term of Union College ends.
26 March	Registration Day for Students, Spring term, Union College.

University Calendar—Concluded

27 March	Recitations begin, Union College.
3 April	Commencement of the College of Pharmacy.
8 May	Commencement of the Medical College.
10 June	Sunday. Baccalaureate Sermon, Union College.
11 June	Prize Contest in Extemporaneous Speaking and Prize Oratory of Juniors and Sophomores.
12 June	Meeting of Trustees, Phi Beta Kappa, Sigma Xi, Alumni.
13 June	Commencement of Union College, the second Wednesday in June. President's reception.
14, 15 June	Entrance Examinations, Union College.

The Faculty of Union College, acting upon authority from the Board of Trustees, have decided to schedule work for Saturday mornings, beginning in September, 1905.

UNION UNIVERSITY

- UNION COLLEGE, Schenectady, N. Y. Founded 1795
  - Academic Department
    - Classical Course
    - Latin Scientific Course
    - Scientific Course
  - Engineering School
    - General Engineering Course
    - Sanitary Engineering Course
    - Electrical Engineering Course
- MEDICAL COLLEGE, Albany, N. Y., Founded 1838
- LAW SCHOOL, Albany, N. Y., Founded 1851
- DUDLEY OBSERVATORY, Albany, N. Y., Founded 1852
- COLLEGE OF PHARMACY, Albany, N. Y., Founded 1881

UNION UNIVERSITY

Union University embraces the following institutions:

Union College

Albany Medical College

Albany Law School

Dudley Observatory

Albany College of Pharmacy

Union College acquired by its charter, granted in 1795, full University powers, but the creation of graduate institutions at Schenectady was not found practicable. Schools of Law and Medicine and also an Astronomical Observatory have long existed at Albany, only a few miles distant. The arrangement naturally suggested by these circumstances was, that the Professional Schools and the Observatory at Albany should be united with Union College, under the Charter and Board of Trustees of the latter. This was accordingly effected by the incorporation of Union University in 1873. The Albany College of Pharmacy was created by the Board of Governors, June 21, 1881, and incorporated as a Department of the University, August 21 of the same year.

The President of Union College and permanent Chancellor of Union University has the oversight of the University, each of the institutions having its resident Dean. The Dean of Union College acts in the place of the President in his absence, and also assists him in matters delegated to him by the President. The University Board of Governors is composed of permanent trustees of Union College and of representatives of each of the other institutions embraced in Union University.

OFFICERS OF THE UNIVERSITY

Chancellor

ANDREW V. V. RAYMOND, D. D., LL. D.

Honorary Chancellor, 1904

THE RT. REV. WILLIAM CROSWELL DOANE, D. D., LL. D.,
Bishop of Albany.

Board of Governors

PRESIDENT

SIMON W. ROSENDALE, Albany, N. Y.

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JOHN H. STARIN	New York City.
JOHN A. DEREMER, A. M.	Schenectady, N. Y.
CLARK BROOKS, A. M.	New York City.
GEORGE ALEXANDER, D. D.	New York City.
WARNER MILLER, LL. D.	Herkimer, N. Y.
NICHOLAS V. V. FRANCHOT, A. M.	Olean, N. Y.

Albany Medical College

SIMON W. ROSENDALE	Albany, N. Y.
ALDEN CHESTER	Albany, N. Y.

Albany Law School

AMASA J. PARKER, LL. D.....Albany, N. Y.
J. NEWTON FIERO, LL. D.....Albany, N. Y.

Dudley Observatory

SAMUEL B. WARD, M. D., PH. D.....Albany, N. Y.
BENJAMIN WALWORTH ARNOLD.....Albany, N. Y.

Albany College of Pharmacy

WILLIS G. TUCKER, M. D., PH. D., F. C. S.....Albany, N. Y.

UNIVERSITY FACULTY

ANDREW V. V. RAYMOND, D. D., LL. D.
Chancellor

BENJAMIN H. RIPTON, PH. D., LL. D.
Dean of Union College and Professor of History and Sociology

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Dean of the Medical Faculty and Professor of Theory and Practice of Medicine, and of Hygiene

J. NEWTON FIERO, LL.D.
Dean of the Law School and Professor of Procedure, Equity and Torts

LEWIS BOSS, A. M., LL. D.
Director of the Dudley Observatory

WILLIS G. TUCKER, M. D., PH. D., F. C. S.
Dean of the College of Pharmacy, Registrar of the Medical College, and Professor of Chemistry and Toxicology

WILLIAM WELLS, PH. D., LL. D.
Professor Emeritus of Modern Languages and Literature, and Lecturer on Current History

JOHN M. BIGELOW, M. D., PH. D.
Professor Emeritus of Materia Medica, Therapeutics and Diseases of the Throat and Nose

HON. JUDSON S. LANDON, LL. D.
Professor of Evidence and Constitutional Law

ALBERT VANDER VEER, M. D., PH. D.
Professor of Surgery

JAMES P. BOYD, M. D.
Professor of Obstetrics, Gynecology and Diseases of Children

WILLIAM HAILES, M. D.
Anthony Professor of Pathological Anatomy, Histology, and Fractures and Dislocations

CYRUS S. MERRILL, M. D.
Professor of Ophthalmology and Otology

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Professor of the Latin Language and Literature

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Professor of Dermatology

LEWIS BOSS, LL. D.
Director of Dudley Observatory

ALFRED B. HUESTED, M. D., PH. G.
Professor of Botany and Materia Medica

GUSTAVUS MICHAELIS, PH. G.
Professor Emeritus of Pharmacy

HENRY HUN, M. D.
Professor of Diseases of the Nervous System

SAMUEL R. MORROW, M. D.
Professor of Practice of Surgery and of Orthopedic Surgery

THOMAS W. WRIGHT, A. M., PH. D.*
Professor of Mathematics

FRANK S. HOFFMAN, A. M., PH. D.
Professor of Mental and Moral Philosophy

OLIN H. LANDRETH, A. M., C. E.
Professor of Civil Engineering

HERMAN CAMP GORDINIER, M. D.
Professor of Physiology

JAMES F. TRACEY
Professor of the Law of Corporations

WENDELL LAMOROUX, A. M.
Librarian Emeritus of Union College

JAMES H. STOLLER, A. M., PH. D.
Professor of Biology and Geology

EDWARD EVERETT HALE, JR., PH. D.
Professor of English

Hon. ALBERT C. TENNANT
Professor of Contracts and the Laws of Real and Personal Property

LEWIS R. PARKER
Professor of the Law of Bailments, Bills and Notes

HOWARD VAN RENSSELAER, M. D.
Professor of Materia Medica and Therapeutics, and Adjunct Professor of Theory and Practice of Medicine

*Absent on leave.

JOSEPH DAVIS CRAIG, M. D.
Professor of Anatomy, and Curator of the Museum

WILLIS GOSS MACDONALD, M. D.
Professor of Abdominal and Clinical Surgery

FLETCHER W. BATTERSHALL
Professor of Elementary Law and Domestic Relations

CHARLES P. STEINMETZ, A. M., PH. D.
Professor of Electrical Engineering

JOHN I. BENNETT, A. B.
Professor of the Greek Language and Literature

HOWARD OPDYKE, A. B.
Professor of Physics

RICHARD MILLS PEARCE, M. D.
Professor of Pathology and Bacteriology

HON. ALTON B. PARKER, LL. D.
Lecturer on Development of the Law

HON. IRVING G. VANN, LL. D.
Lecturer on the Law of Insurance.

HON. D. CADY HERRICK
Lecturer on Municipal Corporations

HON. ALDEN CHESTER
Lecturer on the Federal Judicial System

HON. SIMON W. ROSENDALE
Lecturer on Law from a Humanitarian Standpoint

HON. WALTER B. WARD
Lecturer on Copyrights and Trade Marks

STEPHEN B. GRISWOLD
Lecturer on Books and Their Uses

ALVAH S. NEWCOMB
Lecturer on International Law

JOHN LEWIS MARCH, A. M., PH. D.
Adjunct Professor of Modern Languages

FRANK COE BARNES, A. M., PH. D.
Adjunct Professor of Modern Languages

SPENCER LYMAN DAWES, M. D.
Adjunct Professor of Materia Medica

GARRET VANDER VEER DILLENBACK, PH. G.
Associate Professor of Pharmacy

ANDREW MACFARLANE, M. D.
Clinical Professor of Physical Diagnosis and Medical Jurisprudence, and Law School Lecturer on Medical Jurisprudence

HERMAN BENDELL, M. D.
Clinical Professor of Otology

ARTHUR GUERNSEY ROOT, M. D.
Clinical Professor of Diseases of the Throat and Nose

LEO HAENDELL NEUMAN, M. D.
Clinical Professor of the Theory and Practice of Medicine and Gastro-Enteric Diseases

JESSE M. MOSHER, M. D.
Clinical Professor of Insanity, Neurology and Electro-Therapeutics

HARRY JUDSON LIPES, M. D.
Clinical Professor of Obstetrics

EDWARD ELLERY, A. M., PH. D.
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FRANK B. WILLIAMS, C. E., M. S., PH. D.
Assistant Professor of Engineering

FREDERICK EDWARDS, C. E.
Assistant Professor of Surveying and Drafting

R. NEIL WILLIAMS, E. E.
Assistant Professor of Electrical Engineering

ELMER E. F. CREIGHTON, B. S., E. E.
Assistant Professor of Electrical Engineering

ARTHUR JAY ROY, C. E., A. M.
Assistant in Dudley Observatory

ARTHUR W. ELTING, M. D.
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Lecturer on the History of Medicine

HAMILTON W. MABIE, LL. D.
Lecturer on English Literature

GEORGE EMORY LOCHNER, M. D.
Lecturer on Gynecology

THEODORE JAMES BRADLEY, B. S., PH. G.
Lecturer on Chemistry, Physics and Pharmaceutical Mathematics

ARTHUR TURNER LAIRD, M. D.
Lecturer on Clinical Microscopy

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Lecturer on Ophthalmology and Otology

THOMAS WILLIAMS JENKINS, M. D.
Instructor in Microscopy, Materia Medica and Pharmacognosy

WILFRED SYLVESTER HALE, M. D.
Lecturer and Demonstrator in Anatomy and Assistant Curator of the Museum

WILLIAM B. VARNUM, A. B.
Assistant in Dudley Observatory

CLEMENT F. THEISEN, M. D.
Lecturer on Diseases of the Throat and Nose

CHARLES HARPER RICHARDSON, M. D.
Lecturer on Minor Surgery

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Lecturer on Dermatology and Genito-Urinary Diseases

HENRY LARNED KEITH SHAW, M. D.
Lecturer on Diseases of Children

HERBERT DODGE PEASE, M. D.
Lecturer on Antitoxins and Immunity

ALVAH HARRY TRAVER, M. D.
Instructor in Surgery and Assistant Demonstrator of Anatomy

EDGAR ROSCOE STILLMAN, M. D.
Instructor in Physiology

EDGAR ALBERT VANDER VEER, M. D.
Lecturer on Surgery

EDWIN MACDONALD STANTON, M. D.
Lecturer on Histology

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Instructor in Physiology

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Director of Pharmaceutical Laboratory

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Instructor in Mathematics

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Instructor in Surveying and Drafting

HAROLD W. MANSFIELD, B. S. in M. E.
Instructor in Mechanical Engineering

ROBERT B. CUNNINGHAM, A. B.
Instructor in Mathematics

BENJAMIN BOSS, A. B.
Assistant in Dudley Observatory

CHARLES KNICKERBACKER WINNE, JR., M. D.
Instructor in Bacteriology

GEORGE GUSTAVE LEMPE, M. D.
Instructor in Anatomy

DONALD BOYD, M. D.
Demonstrator in Anatomy of Nervous System and Assistant in Normal Histology

EDWIN FORREST SIBLEY, M. D.
Instructor in Clinical Microscopy

SILAS LORENZO FILKINS, M. D.
Prosector of Anatomy

STUDENTS OF UNION COLLEGE

Abbreviations

c, A. B. course; *ls*, Ph. B. course; *s*, B. S. course; *e*, B. E. course in General Engineering; *se*, B. E. course in Sanitary Engineering; *cc*, B. E. course in Electrical Engineering; N. S., North Section; M. S., Middle Section; S. S., South Section; N. C., North College; S. C., South College.

Seniors, Class of 1905

e Clarence Stilman Arms.....*Sidney*.....Δ ϒ Lodge
ee José M. Bastos.....*Brazil*.....514 Union St.
c Elvin Jay Becker.....*Middleburgh*..So. Colonnade.
c John Francis Bradley.....*Troy*.....604 Fourth St.
ee James Hannah Cunningham..*Schenectady*..1101 State St.
ls Ernest Judson Ellenwood....*Dannemora*.....Δ ϒ Lodge
ls George Myers Elmendorf.....*Coeymans Hollow*.ΒΘΠ House
ee Frank Thorburn Forster.....*Nyack*....515 Summit Ave.
ls Louis Chrisler Hart.....*Albany*.....K A Lodge
e Neil Cummings Holdredge....*West Burlington*.ΒΘΠ House
s Thomas Milton Holmes.....*Albany*.....Δ ϒ Lodge
e William Theodore Hunt.....*Otego*.....Silliman Hall
se Eric Ture King.....*Rosebank*.....Λ Δ Φ House
ee Morland King.....*Brooklyn*.....Λ Δ Φ House
e Herman Carl Kluge.....*Elmira*..... 9 N. S. N. C.
ls Frank Ira Losee.....*Fergusonville*.13 N. S. N. C.
ee Ross S. McClellan.....*Tacoma, Wash.*66 Union Ave.

s Charles Malcolm McGregor..*Gloversville*...Silliman Hall
c Thomas Earl McGuirk.....*Albany*.....Δ Φ House
ee William Orson Morse.....*Camden*.....204 Park Ave.
ee John Rowland Nowell.....*Anderson, S. C.*..S. S. S. C.
e LeRoy Lee Odell.....*Poughkeepsie*..B Θ Π House
c Frederic Curtis Patton.....*Rensselaer*....A Δ Φ House
c Morris Thomas Raymond.....*Schenectady*...A Δ Φ House
ee Aquiles Rodriguez.....*Nuevitas, Cuba*...514 Union
e Edmund Gaillard Simons.....*Eutawville, S. C.*..K A Lodge
ls James Rose Stevens.....*Cohoes*.....Φ Γ Δ House
ls Alexander J. Thomson.....*Schenectady*.20 N. Church St.
e Karl Frederick West.....*Caldwell*.....K A Lodge

Seniors—29.

Juniors, Class of 1906

ee LeRoy Beers.....*Schenectady*....28 Eagle St.
s William LeRoy Brooks.....*Albany*.....A Δ Φ House
e Melvin David Casler.....*Johnstown*....8 N. S. N. C.
ee Arnold G. Chapman.....*Guilderland*.....Ψ Υ House
c Philip Luke Classen.....*Albany*.....Ψ Υ House
e Edgar Stone Closson.....*Gloversville*.....Δ Υ Lodge
c Harry Cook.....*Albany*.....Φ Γ Δ House
ee Ernest Montgomery Dann....*Downsville*....Φ Δ Θ House
ee Clarence R. Darby.....*Rochester*.....227 Nott St.
s Charles Stevens Dwight.....*Columbia, S. C.*..K A Lodge
e Edgar W. Earle.....*Lancaster*....5 N. S. N. C.
s James Elmer Gilmour.....*Ogdensburg*.....Δ Υ Lodge
c Paul Jonathan Hagar.....*Plattsburgh*...B Θ Π House

c HARRY NELSON HAIGHT.....*Fishkill*.....Φ Δ Θ House
e GEORGE FRANCIS HALL.....*Albany*.....Φ Δ Θ House
ls GEORGE WALTER HITT.....*Unadilla*.....Δ ϒ Lodge
e LESLIE GILBERT HOLLERAN.....*Hadley*.....Δ ϒ Lodge
ee CLAUDE KINNE HUSTON.....*Selma, Ala.*326 Summit Ave.
ls DANIEL FERGUSON IMRIE.....*Caldwell*.....Δ Φ House
e ALFRED KAUFMAN.....*Rensselaer*.....57 Glen St.
e WARNER KING.....*Brooklyn*.....A Δ Φ House
c GEORGE B. LAUGHLIN.....*Saratoga Springs*..Δ Φ House
s LEON RAY LEWIS.....*Gilboa*.....North Colonnade
s HERRICK MCCLENTHEN.....*Jefferson*.....2 N. S. N. C.
ls PAUL ALONZO MEAD.....*Schenectady*.....X Ψ Lodge
ls FLOYD LESLIE MILLER.....*Fort Plain*.....Δ Φ House
ee JOHN LESLIE MOON.....*Cooperstown*..Φ Δ Θ House
ee HARRY E. NORWOOD.....*Hampden Corner, Maine*..704 Central Ave.
e WALTER ERNEST NUTT.....*Cohoes*.....5 N. S. N. C.
e JOHN ALOYSIUS O'DONNELL....*Salem*.....4 N. S. N. C.
ee JOHN BRADBURY PEEBLES.....*Petersburg, Va.*..S. S. S. C.
ee LEIGHTON HARTWELL PEEBLES..*Petersburg, Va.*..S. S. S. C.
ee SAMUEL JOHNSTON RAYMOND...*Buffalo*.....A Δ Φ House
c BYRON WILLIAM REED.....*Olean*.....Δ ϒ Lodge
s LORENZO N. RIDER.....*Bath*.....X Ψ Lodge
ee ROBERTO DE M. SAMPAIO.....*Brazil*.....P. O. Box 263
ee RAYMOND DERRICK SHERMAN...*Melrose*.....10 N. S. N. C.
e ROLLAND BARKER SMITH.....*Peru*.....Δ ϒ Lodge
e WILLIAM EDMUND STONEY.....*Pinopolis, S. C.*..K A Lodge
e HARRY ADELBERT SYLVESTER...*Schenectady*.817 Locust Ave.
s GEORGE ARTHUR VEDDER.....*Schenectady*.....X Ψ Lodge

ee Carl Otto Von Dannenberg...*Stapleton*.....Λ Δ Φ House
ee Mason William Wadsworth..*Binghamton*...Λ Δ Φ House
s Charles Newman Waldron...*Detroit, Mich*...M. S. N. C.
ee John Gibbon Webb.....*Summerville, S. C.*S. S. C.
ee Nelson Philip Weier.....*Lyons*.....N. S. N. C.
c Walter Fanstone Wellman...*Schenectady*...922 State St.
ee Frank Sperring Wheeler....*Sydney*.....Δ ϒ Lodge
ls Meade LaFayette Zimmer....*Gallupville*...B Θ Π House

Juniors—49.

Sophomores, Class of 1907

e Andrew Ordell Avery.....*Delanson* .....Delanson
ls Raymond S. Bennett.....*Schenevus*...14 N. S. N. C.
e Howard Elmer Bishop.....*Sayre, Pa*.....Φ Δ Θ House
e Arthur Farrington Blinn....*New York City*..Ψ ϒ House
s Earl Croul Bradbeer.....*Detroit, Mich*..Λ Δ Φ House
e James G. Brennan.....*Albany*.....Δ Φ House
ls Louis Maynard Bryant.....*Le Roy*.....Δ ϒ Lodge
e Hervey Edwin Butcher.....*Oneida*.....Ψ ϒ House
e Herbert Edward Cantwell...*St. Simons Island, Ga.* Φ Γ Δ House
e Fred Henry Davidson.....*Cooperstown*...Φ Δ Θ House
e Hugh Garnett Davis.....*Lynchburg, Va.*.12 N.S. N.C.
ls Jesse Abram DeMey.....*Sodus*.....Δ ϒ Lodge
c Richard Sylvester Dillon, Jr.*Rensselaer* .....Rensselaer
c Simeon Earl Dockstader.....*Fonda*....113 Nott Terrace
c Stewart Dockstader.....*Fonda*....113 Nott Terrace
ls Marcus Holladay Elliott....*Englewood N. J.*Φ Δ Θ House

e Edward James Fairbairn.....*Buffalo*.....Λ Δ Φ House
e Nicholas V. V. Franchot, 2d..*Niagara Falls*....S. S. S. C.
s Harold Gardiner.....*Hadley*.....Λ Δ Φ House
ls Fred. Girvin.....*Schenectady*...708 Westover Ave.
e Eugene Watson Goff.....*Plattsburgh*.....Δ Υ Lodge
ls Fred Coonley Griffen.....*Middleburgh*.612 Chapel St.
e Earl Ewan Harvey.....*Schenectady*.316 Clinton St.
e Edmund Francis Heard.....*Schenectady*.1105 Union St.
s Dudley Toll Hill.....*Schenectady*.1725 Union St.
e Gordon Russell Langley.....*Schenectady*....7 Park Ave.
e John Patrick Lucey.....*Little Falls*.27 Lafayette St.
e Robert Fuller Mac Mullen..*Schenectady*519 Hamilton St.
ls Willard Andrew McClellan..*West Hebron*..Λ Δ Φ House
e Walter T. McIntosh.....*Buffalo*.....9 M. S. N. C.
e Benjamin Nox Mooers.....*Plattsburgh*.....S. S. S. C.
e Frank Leslie Moore.....*French Mountain*.1 M.S.N.C.
e Fred Munk.....*Rockville Centre*.1 S. S. N. C.
e Frederick Whitman Newton..*Buffalo*.....10 M. S. N. C.
e Alexander Joseph Nicht, Jr..*Auburn*.....11 N. S. N. C.
c George Burton Noble.....*Jonesville*.....7 M. S. N. C.
e Ernest Baxter Osborne.....*Chicago, Ill*.....S. S. S. C.
c Lewis Stewart Parsons.....*Liberty*.....Δ Υ Lodge
e Rollin D. Reed.....*Binghamton*...Van Vranken Ave.
e El Roy Shibley Reeder.....*Binghamton*.....Ψ Υ House
s James Henry Richards.....*Englewood, N. J.*.ΦΔΘ House
e Glenn Ellison Richardson...*Herkimer*.....Ψ Υ House
e William Clement Robinson...*Watervliet*.....Watervliet
e Everett Irving Rogers, Jr....*Providence, R. I.*Δ Υ Lodge

e Theodore de J. de Sabla, Jr...*Platteclove*....A Δ Φ House
e John LeRoy Sawyer.....*Cherry Valley*...X Ψ Lodge
e Edwin Mathias Secrist.....*Swounville*..620 Chapel St.
s Reuben Peckham Sleicher...*Albany*.....X Ψ Lodge
e William Stuart Speir.....*Albany*.....Ψ ϒ House
e Ralph Winne Stearns.....*South Berlin*..420 Crane St.
c William Foster Taylor.....*Schenectady*..8 M. S. N. C.
e Allrich Sanford Tiedeman...*Schenectady*..511 Smith St.
e Peter Willoughby Traynor...*Owego*.....2 N. S. N. C.
e Ralph Trumbull.....*Johnstown*.....Δ Φ House
e Paul Wait.....*Fort Edward*..418 Union St.
e Charles Ray Waters.....*Avoca*.....Φ Δ Θ House
e William Earl Weller.....*Schenectady*.614 Chapel St.
e Royton F. Wheadon.....*Johnstown*.....Δ Φ House
c Albert Huntley White.....*Schenectady*..20 Union Ave.
e Ernest Daniel Wilmot.....*Malta*.....13 S. S. N. C.
e Ernest Macmillan Wilson...*Hebron*.....3 N. S. N. C.

Sophomores—61.

Freshmen, Class of 1908

e John L. Bacon, Jr.....*Elmira*.....Ψ ϒ House
e Thomas Sherwood Bailey....*Burnt Hills*...B Θ Π House
c Harris Sherley Bartholomew.*Indianapolis, Ind*.5 M.S.N.C.
e Harry Vernon Beach.....*Warrensburg*..378 Paige St.
ls Henry Winne Bell.....*Albany*.....K A Lodge
e James Edward Bell.....*Westmoreland*.Φ Δ Θ House
s William Francis Bell.....*Delhi*.....2 S. S. N. C.

e LEWIS CORTRIGHT BENNETT....*Chicago, Ill*...A Δ Φ House

e SAMUEL JAMES BENNETT.....*Rensselaer* .....Rensselaer

e BRADFORD B. BINGHAM.....*Northampton, Mass*..47 Euclid Ave.

e EMANUEL HERBERT BOCIAN....*Albany*.....12 S. C. N. C.

s ALBERT MOSELY BOWMAN.....*Upper Troy*.....Ψ ϒ House

s JOSEPH W. BRYAN.....*Auburn*.....11 N. S. N. C.

e SAMUEL HYDE CABOT.....*Bristol, R. I*....S. S. S. C.

e JOSEPH CAPLAN.....*Albany* .....Albany

e WILLIAM H. C. CARHART.....*Chicago, Ill*.....X Ψ House

e WALTER JOHN CLARK.....*Albany*..... 118 Park Place

s WILLIAM BENNETT COLBURN....*Detroit, Mich*.A Δ Φ House

e BYRON ALONZO COLLINS.....*Binghamton*.....Ψ ϒ House

e JAMES MILO CONKLIN.....*Saranac Lake*.Φ Γ Δ House

e WILLARD D. COVEY.....*Lyon Falls*....7 M. S. N. C.

e THOMAS AMBROSE CURTIN.....*Marcellus*...118 Park Place

ls WILLIS DAVID CURTISS.....*Sodus*.....Δ ϒ Lodge

e THOMAS DARROW.....*Princetown*..B Θ Π House

ls ARTHUR EDGAR DAVIES.....*Wales, Iowa*.140 Van Vranken Ave.

e MICHAEL J. J. DWYER.....*Troy* .....Troy

e CORNELIUS ERNEST ELMENDORF.*Coeymans Hollow*....B Θ Π House

e JOHN BENJAMIN FLOWERS.....*Schenectady*.815 Locust Ave.

ls JOHN JOSEPH FOLEY.....*Watervliet* .....Watervliet

s FRANCIS FORBES.....*Burnside, Ct*.16 M. S. N. C.

ls CHESTER G. FULLERTON.....*Schenectady*..17 Univ. Place

ls GEORGE GIFFORD.....*Schenectady*...785 State St.

ls PAUL RICHARD GORDON.....*Elmira*.....Φ Γ Δ House

e DAVID GRANT.....*Green Island*.15 M. S. N. C.

e Carlos Gerst Hafley.....*Albany*.....Φ Δ Θ House
e Walter G. Hale.....*Putnam*....136 Park Place
e George Christian S. Halla...*Troy*..... Φ Γ Δ House
e Thomas Edward Hanigan....*Schenectady*...938 State St.
c Leon C. Heilbronner.....*Schenectady*..238 Union St.
e Ferdinand Helm.....*Saratoga*.....Δ Φ House
c Hiram Thomas Hildreth.....*Middleville*....A Δ Φ House
e William Duelton Hildreth..*Herkimer*.....A Δ Φ House
e Leland Silas Hoffman.....*St. Johnsville*..20 Mynderse St.
e Jared Shepard Horton.....*Albany* .....Albany
e Milton K. Huppuch.....*Sandy Hill*.....Ψ Υ House
e Harold Warner Jewell.....*Schenectady*.12 Chestnut St.
e Harold Lansing Keith.....*Schenectady*..1030 State St.
s James Edward Kimball.....*Troy*..... X Ψ Lodge
c Howard William Kitchin.....*Schenectady*....81 Glenwood Blv'd.
e Alexander Dorn Kline.....*Schenectady*...21 Parkwood Blv'd.
e Albert Southard Knight.....*Round Lake*...1 M. S. N. C.
e Franklin Eugene Kruesi.....*Schenectady*...16 Union St.
c Arthur Lewis La Roche.....*Binghamton*....Ψ Υ House
e Selah S. Lawrence.....*Marcellus*...118 Park Place
e Howard Revere Locke.....*West Medford, Mass*...X Ψ Lodge
c Robert Elmer MacNamara...*Brooklyn*..... Δ Υ Lodge
s Cortland Teneyck Maher, Jr..*Albany* .....Albany
e Augustine Marx.....*Amsterdam*....9 S. S. N. C.
ls Walter Scott McNab.....*Schenectady*.13 Romeyn St.
c Frederick Henry Meeker.....*Unadilla*....12 M. S. N. C.
c Herman Lewis Meyer.....*Green Island*..Green Island

s JAMES P. MINAHAN.....*Schenectady*..143 Lafayette St.
e HAROLD RANSOM MOORE.....*Ogdensburg*...Φ Δ Θ House
e ARBA ROMANS MORSE.....*Sidney Centre*.11 M. S. N. C.
e CHARLES FRANKLIN MULROONEY.*Albany*.....237 Park Place
e JOHN FREDERIC NASH.....*Plattsburg*.2026 Union Av.E.
s D. L. PALMER.....*Masonville*...3 M. S. N. C.
e LEVI PARSONS.....*Gloversville*.....K A Lodge
e FREDERICK ROYAL PECK.....*Deansboro*....Φ Δ Θ House
e EDWARD J. PENROSE.....*Cohoes*.....8 S. S. N. C.
e ARTHUR EMERSON PITTS.....*Cohoes*.....Cohoes
ls CLARENCE HENRY POWELL.....*Cairo*.....1 M. S. N. C.
e J. STANLEY PRESTON.....*Sharon Springs*.8 M. S. N. C.
e ANDREW VAN VRANKEN RAYMOND, JR.....*Schenectady*...A Δ Φ House
e FRANK SWAN RAYMOND.....*Ludlow, Vt*.209 Victory Ave.
s DANIEL TOBIAS READ.....*Mouck's Corner, S. C.*...29 Jay St.
e EDWIN HAZELETT ROBINSON....*Watervliet*.....Watervliet
s JOHN LESLIE SCHOOLCRAFT.....*Schenectady*....15 Washington Ave.
e RAYMOND O. SHELLEY.....*Albany*.....Ψ Υ House
e PHILIP FOSTER SHUTLER.....*Watertown*....Φ Δ Θ House
e BERLIN JAMES SMITH.....*Marcellus*...118 Park Place
e HARRY AMOS SMITH.....*Gloversville*...Φ Γ Δ House
e RAYMOND EDWIN SNOW.....*Holyoke, Mass*...Δ Υ Lodge
e FRANK R. STEVENS.....*Albany*.....Ψ Υ House
e ROSS WILLIAMS TIFFANY.....*Schenectady*.131 Furman St.
e REDFIELD TOMLINSON.....*Batavia*.....S. S. S. C.
e HARRY L. TRUMAN.....*Flemingsville*..Φ Δ Θ House
s FRANK EARL VAN OLINDA.....*Schenectady*..10 Union Ave.

s PETER EARL VEDDER.....*Schenectady*....X Ψ Lodge
ls MARVIN R. VINCENT.....*Orange, N. J.*....Ψ ϒ House
e CARL H. VOGT.....*Buffalo*.....Φ Δ Θ House
s JOHN JACOB VROOMAN.....*Schenectady*..9 Washington Ave.
c MARK SKINNER WATSON.....*Plattsburgh*.....S. S. S. C.
c MARTIN HENRY WEYRAUCH.....*Liberty*.....Δ ϒ Lodge
ls EARL WELLINGTON WILEY.....*Holyoke, Mass*..Δ ϒ Lodge
e GEORGE WILLIAM WRIGHT.....*Ogdensburg*...Φ Γ Δ House
ls WILSON D. YATES.....*Schenectady*.111 So. Church St.
c ADELBERT CLARENCE YOUMANS..*Albany* .....Albany

Freshmen—98

Irregular Students

(06 *e*) LEVAN RANSOM BARNES...*Clyde*.....Ψ ϒ House
(07 *c*) CYRUS WILBER BRIGGS.....*Schenectady*.29 Wendell Ave.
(06 *e*) HARRY DANIEL FULLER.....*Rochester*.....Δ ϒ Lodge
(05 *e*) GEORGE E. HELLICAR.....*Sidney, Australia*..120 Lafayette St.
(07 *e*) GEORGE MAURE, JR.....*Richmond Hill*...Δ ϒ Lodge
(06 *ee*) GEORGE CHAPMAN NEWBURY.*Goshen*.....Ψ ϒ House
(05 *e*) JOHN HENRY RAY.....*Rheims*....North Colonnade

Irregular Students—7

Graduate Students

LEROY B. CRAMER..... *Mechanicville*...630 Liberty St.
LIMGAD K. EVANS..... *Wales*.....5 M. S. N. C.

Graduate Students—2

Summary of Students, Union College

Seniors	29
Juniors	49
Sophomores	61
Freshmen	98
Irregular Students	7
Graduate Students	2
Total	246

STUDENTS OF THE ALBANY MEDICAL COLLEGE

Fourth Year Class

KENNETH DANIEL BLACKFAN.....Cambridge, N. Y.
JAMES MARMADUKE BODDY, A. M.....Troy
HOMER ANDREW BUSHNELL.....North Adams, Mass.
GEORGE MORRIS CASEY.....Schuylerville
ARCHIE BERT CHAPPELLE.....Kingston
ARTHUR PRESTON CLARK.....Albany
KERN ROMEO COFFIN.....Cooperstown
MILES JACOB CORNTHWAITE.....Troy
JOHN HENRY COUGHLIN.....Troy
WALTER ALLEN COWELL, A. B.....Albany
JOHN DIXON CRANE.....Hawley, Penn.
O. CHARLES CURTIS.....So. Egremont, Mass.
THEODORE DAVID DOCKSTADER.....Sharon Centre
PATRICK JOHN DONAHOE.....Albany
WILLIAM MULVEHILL DWYER.....Amsterdam
JOHN PETER FABER.....Albany
FRED EDWARD CREMORE FLANAGAN.....St. Regis Falls
THOMAS JOSEPH FLYNN.....Johnstown
PERLIA ELIZAH CARLOCK.....Sprakers
WILLIAM JOSEPH GARVEY.....Albany
CHARLES ERASTUS GREEN, M. D.....Brooklyn
CHARLES WILLIAM LOUIS HACKER.....Albany
WALTER ENNIS HAYS, A. B.....Albany

Chester Alan Arthur Hemstreet.....Waterford
Thurman Alson Hull.....Williamstown, Mass.
Lemuel Rankins Hurlbut.....Troy
Frank James Hurley.....Bennington, Vt.
Mathew Joseph Keough.....Cohoes
Oscar Franklin Larson.....Poultney, Vt.
Edward Miltmire.....Catskill
Francis Joseph Noonan.....Troy
George Washington Papen, Jr.....Albany
Herbert Bowen Reece.....Troy
William Garfield Rommel.....Troy
Henry Stanton Rowe, Jr., A. B.....Cohoes
Harry Rulison.....Albany
Frank George Shaible.....Albany
John Ralph Schermerhorn.....Randall
Frederick Foster Shirck.....Saratoga Springs
Arthur Hamilton Schuyler.....Fonda
Francis Joseph Scott.....Cohoes
Benjamin Franklin Seaman.....Matteawan
William Francis Shanley, A. B.....Albany
Hamilton Munn Southworth.....Nassau
Charles William Stratton.....Lee, Mass.
Charles Clark Sweet.....Petersburg
James Harvey Van Buren.....Jefferson
Edward Hellis Vines.....Saratoga Springs
George Walrath.....St. Johnsville
Alfred LeRoy Warner.....Troy
James Watson White.....Wappingers Falls

EDWARD BARNES WILSON, A. B.....Hudson
ROSCOE CONKLING WATERBURY.....Nassau

Fourth Year Students—53.

Third Year Class

HENRY FRANCIS ALBRECHT.....Troy
FRED. NICHOLAS BIBBY.....Pottersville
JOHN BREEN.....Wevertown
ROY MUNRO COLLIE.....Johnstown
MOREY CHARLES COLLIER, PH. B.....Savona
CHARLES ELISHA COLLINS, PH. G.....Troy
FREDERICK CHARLES CONWAY.....Albany
ADELBERT STEPHEN DEDERICK.....Cohoes
THEOBOLD FRED DOESCHER.....Albany
LEE ROY DEMBAR.....Gloversville
WILLIS WOODFORD DUTCHER.....Albany
VERNON R. EHLE.....Gloversville
HERMON ERNEST GAK.....Fairmount
GEORGE RHEINHOLD GOERING.....Utica
HOWELL BURROUGH GRANT.....Afton
PERCIVAL WILLIAM HARRIG.....Albany
JOSEPH FRIEND HARRIS.....Albany
CLINTON BENJAMIN HAWN, B. S.....Albany
SAMUEL ORESTES KEMP.....Albany
WINFIELD SNELL KELTS.....Fort Plain
WILLIAM ANDREW KRIEGER.....Poughkeepsie
PRICE LEWIS.....Remsen

*Emmett Judson Lyman.....Springfield, Mass.
Floyd Dempster Michael.....Lassellsville
David Cushing Nolan.....Albany
Charles Albert Prescott.....North Creek
Walter Ancel Reynolds.....Albany
John Fletcher Robinson, A. B.....Albany
Wellis Nelson Simons.....Canajoharie
Eugene Gillis Steele.....North Adams, Mass.
Lemon Dwight Washburn.....Fort Ann
Edward Gove Whipple.....Malone

Third Year Students—32.

Second Year Class

Charles Sanford Allen, Jr.....Rensselaer
Floyd Jerome Atwell.....Oaksville
George Warren Beebe.....Johnstown
Joseph Lewi Bendell, A. B.....Albany
Edward George Benson.....Albany
Montgomery Paulison Biggam.....Albany
Howard Philip Carpenter.....Highland
William David Collins, A. B.....Green Island
Erastus Corning, A. B.....Albany
Marcus Denis Cronin.....Welton
Walter J. Diver.....Troy
J. Lewi Donhauser, A. B.....Albany
Alfred Thomas Gabriels, A. B.....Watervliet

*Matriculant only.

LOUIS HERBERT GAUS.....Albany
NORMAN CHARLES GOODWIN, A. B.....Albany
EDWARD COCKRON GOW.....Schuylerville
ALFRED WOODWARD GROVER.....Kingston, Penn.
ALEJANDRO BUITRAGO GUELLIOD.....Guayama, P. R.
AUGUSTUS JOSEPH HAMBROOK.....Cohoes
EDWARD WILLIAM JACKSON.....Little Falls
DEAN WARDELL JENNINGS.....Cairo
CLARENCE ROBERT KAY.....Amityville
ROY CHARLES KEIGHER.....Schenectady
DAVID KIDD.....Troy
RICHARD ANDREW LAURENCE, A. B.....Albany
TIFFANY LAWYER.....Albany
JACOB HENRY LINDEN.....Sharon Springs
KENNETH KENYON LINSON.....Kingston
ROBERT SUTTENFIELD LIPES.....Nassau
*JAMES E. MALONEY.....Albany
JOHN SEARS MCCORMACK.....Albany
JEROME MYERS, A. B.....Albany
ZENAS VAN DUZEN ORTON.....Northampton
WILLIAM CLARE PORTER.....Lestershire
STEPHEN JOHN HENRY REED.....Schenectady
JAMES JOSEPH SHEA.....Hoosick Falls
LEONIDE GEORGE SUPRENANT.....Cohoes
WILLIAM CARL TREDER, PH. B.....Albany
HERBERT JOHN WRIGHT.....Rhinebeck

Second Year Students—39.

*Matriculant only.

First Year Class

EARL ERRET BABCOCK.....Deer River
FRED. J. BARNET.....Albany
WILLIAM EDWARD BARTH.....Schaghticoke
JOHN ADKINS BATTIN.....Watervliet
HARTLEY EDWARD BOOROM.....Interlaken
GEORGE HENRY BRADSHAW.....Upper Troy
SAMUEL PIERSON BRUSH.....Troy
EUGENE HOWARD BURNES.....Amsterdam
*DENNIS JAMES CARROLL.....North Hebron
WILLIAM HENRY CONGER.....Union Church
JOSEPH DAVIS.....High Falls
JOSEPH RAOUL DUGAS.....Cohoes
JOHN MURRAY ENGLISH.....Troy
EARL WILLIAM FULLER.....Utica
FRANK GARTEN.....Westchester
*JOHN LUCIAN GIBEAU.....Cohoes
JOHN ROUSE GILLETT, A. B.....Kingston
EDWARD FRANCIS HAGEDORN.....Gloversville
EDWIN WALLACE HANNOCK.....Albany
ROSSLYN PHILIP HARRIS.....Delanson
JOHN THOMAS HOPKINS HOGAN.....Troy
JAMES EDWARD HOURIGAN.....Schenectady
STANTON PERRY HULL.....Berlin
GEORGE BURR KINNER.....Albany
JOHN JOSEPH ALOYSIUS LYONS, PH. G.....Albany
ALEXANDER MITCHELL LOWENSTEIN.....Troy

*Matriculant only.

ROBERT DANIEL MANNING.....Mohawk
CHARLES GIBSON MCGAFFIN, PH. B.....Cohoes
GEORGE BOLTON MCMURRAY.....Troy
ROBERT COPELAND MOONEY.....Gloversville
WILLIAM LESLIE MUNSON.....Granville
JOHN PAUL O'KEEFFE.....Hadley
CHARLES BATES PHILLIPS.....Gloversville
RALPH JOHNSON PICKERING.....Troy
GEORGE PHILO PITKIN.....Schroon Lake
MILTON WOOLEY PLATT.....Albany
JOHN JOSEPH RAINEY.....Troy
EDWARD JOHN RILEY.....Rensselaer
GEORGE STEPHEN SILLIMAN, A. B.....Stockport
RAY ERNEST SMITH.....Ballston Springs
HERBERT EDGAR SPERRY.....Penfield
WILLIAM J. THOMPSON.....Oneonta
JOSEPH EDWARD WINDBIEL.....Amsterdam
JOHN WINGATE.....Princetown
PAUL VIRGIL WINSLOW.....Warwick
CALVIN BASSLER WITTER.....Albany

First Year Students—46.

STUDENTS OF THE ALBANY LAW SCHOOL

Senior Class

HAROLD J. ADAMS ..... Albany
CLAUDE B. ALVERSON ..... Watertown
LEWIS M. AUSTIN ..... Union Valley
CLARENCE P. BAKER ..... Lockport
WYMAN S. BASCOM ..... Fort Edward
HENRY W. BENTON ..... Saratoga Springs
CHAS. BODMAN., JR ..... Gouverneur
E. R. BOOTEY, JR ..... Jamestown
M. F. CAVANAUGH ..... Pawtucket, R. I.
C. C. CHAPPELL ..... Kingston
JOHN W. COLLOPY, JR ..... Troy
S. A. CONGER ..... Gouverneur
ANDREW J. COOK ..... Kingston
JOHN B. COUGHLIN ..... Watertown
CLAUDE T. DAWES ..... Johnstown
ANTHONY S. DESANTIS ..... Niagara Falls
GEO. W. DONNAN ..... Troy
JOS. G. FENSTER ..... Troy
DANIEL S. FLINN ..... Albany
ORIN Q. FLINT ..... Athens
MCINTYRE FRASER ..... Johnstown
EARL H. GALLUP ..... Albany
GEORGE E. GRIFFIN ..... Albany
JAMES A. HATCH ..... Chittenango

Dennis J. Harrington.....Saratoga
William J. Healey.....Hoosick Falls
John L. Henning, Jr.....Saratoga
C. A. Higgs.....Brocton
Everett B. Holmes.....Meridale
Edward C. Jameson.....Utica
Leland C. Jones.....Jefferson
Harry D. Kerr.....Los Angeles, Cal.
George F. Lawrence.....Manchester, Vt.
Martin F. Lynch.....Albany
W. Ward Norton.....Hartford
Quincey McGuire.....Albany
George L. Morse.....Pittsford
Sherman A. Murphy.....Albany
A. Lindsay O'Connor.....Hobart
W. Fred. Pratt.....Sherman
Gilbert V. Schenck.....Rensselaer
J. Donald Shoecraft.....Webster
Augustus Shufeldt.....Kingston
John A. Slade.....Saratoga
Clare Sinclair.....Bath
George I. Sleicher.....Albany
Albert E. Smith.....Albany
Frank M. Smith.....Springfield Centre
J. Taylor Smith.....Delmar
Frederick T. Stetson.....Albany
Benj. Sullivan.....Dolgeville
Schuyler K. Sweeting.....Dolgeville

MARSH N. TAYLOR.....Rochester
W. F. THOMPSON.....Jersey City
WALTER S. THROOP.....Port Gibson
THOMAS R. TILLOTT, JR.....Schenectady
HENRY TOOHEY.....Schuylerville
A. D. VAN BUREN.....Kingston
JAMES H. VANDERLYN.....New Paltz
ORANGE L. VAN HORNE.....Cooperstown
HARRIETTE M. J. WOOD.....Poughkeepsie
THOMAS WOODS.....Albany
WILLIAM B. ZIMMER.....Rochester

Seniors—63.

Junior Class

THOS. H. BURGESS.....Auburn
EDWARD D. BUSH.....Glens Falls
JAMES E. CARHART.....New Baltimore
CLEMENT C. COLE.....Romulus
CHARLES C. CONGDON.....Palmyra
RALPH M. COOPER.....Catskill
THADDEUS G. COWELL.....Albany
FRANK H. CRONKHITE.....Fort Edward
BYRON L. DAVIS.....Saugerties
DENNIS F. DUNN.....Troy
CHARLES L. EARL, JR.....Herkimer
LEOPOLD FELIU.....Porto Rico
STEPHEN C. FIERO.....Saugerties
MARION H. FISHER.....Jamestown

DAVID S. FISK.....Jay
EDWIN L. FOWLER.....Altamont
NORMAN D. FORD.....Oak Hill
JOHN L. FRAY.....Catskill
HARRISON I. GARDNER.....Nortonhill
IVAN A. GARDNER.....Goshen
SAMUEL A. GLASSER.....New York City
JOHN F. GLEASON.....Albany
C. W. GORMLEY.....Troy
VIRGIL GUERNSEY.....Howes Cave
H. D. HARMAN.....Brockport
F. L. S. HARMON.....Rutland, Vt.
MORGAN A. JONES.....Hudson
GERTRUDE L. KEEGAN.....Binghamton
C. H. KNAPP.....Saratoga Springs
C. H. LEWIS.....Saratoga
ABRAHAM LIPSET.....Schenectady
JOSE A. LOPEZ.....Porto Rico
JOHN J. MCGRAIL.....Albany
JASPER G. PAGE.....Lincoln, Vt.
ROY H. PALMER.....Troy
W. L. L. PELTZ.....Albany
GEORGE A. QUIGLEY.....Troy
BENJ. ROWE.....Saugerties
WILLIAM F. RYAN.....Fort Edward
EUGENE L. SANFORD.....Nicholville
CHARLES F. SHERMAN.....Highland
A. B. SHUFELDT.....Kingston

BENJ. H. SMITH.....Patchogue
GEORGE C. STEELE.....Pittsford
GEORGE R. TEMPLETON.....Troy
C. C. TENNANT.....Cooperstown
JOHN B. THACHER.....Albany
ED. J. WEIDERHOLD.....Schenectady
MORGAN E. WELSH.....Rock City Falls
PERLEY S. WHEELER.....Plattsburgh
H. LESLIE WILBUR.....Cambridge
JAMES E. WILCOX.....Oxford
J. FRANK ZOLLER.....Hammond

Juniors—53.

STUDENTS OF THE ALBANY COLLEGE OF PHARMACY

Senior Class

Fred Greenough Atwell.....Cohoes
Harry Thomas Avery.....Hunter
Henry Floyd Banta.....Hagaman
Charles William Burdick.....Schenectady
Arthur James Curtis.....Watervliet
Charles Easton Devenburgh.....Amsterdam
Chauncey George Douglas.....Saratoga Springs
George Arthur Elliott.....Holyoke, Mass.
Chester Andrew Gallager.....Schenectady
Charles Edward Gramp.....Hudson
Frank Le Roy Haley.....Hoosick Falls
Henry Heinmiller.....Albany
Robert Ralph Higgins.....North Creek
Fred Arthur Johnson.....North Creek
Ralph Barton Jones.....Syracuse
Frank George Killigrew.....Holyoke, Mass.
Henry Raymond Liddle.....Johnstown
Harry Jenner Loveys.....Johnstown
George Wesley Mather.....Cohoes
Peleg Austin Matteson.....Bennington, Vt.
John Henry McKeon.....Bennington, Vt.
William Francis Nagle.....Chicopee, Mass.
Arthur LeRoy Neher.....Schenectady

Joseph Andre Phenix.....Lewiston, Me.
Agnes Josephine Quinlan.....Bennington, Vt.
Herbert Cornelius Wyncoop Retallick.....Canajoharie
Clifford Henry Rudes.....Dolgeville
Edward David Shoor.....Albany
Robert Bruce Smith.....Plattsburgh
Howard Meade Tice.....Cincinnatus
William Charles Tiernan.....Albany
Edgar Leonard Walker, Jr.....Moriah
Harry Waltermire.....Chatham
Hiram Moore Wells.....Glens Falls

Seniors—34.

Junior Class

Joseph Augustus Babcock.....Greenwich
William Channing Barton.....Ballston Spa
Joseph William Beavan.....Greenwich
John Howard Berard.....Highland Falls
Henry Stephen Bertrand.....Tupper Lake
Augustus Martin Brown.....New York City
John Henry Christopher.....Schenectady
Teressa Cecilia Conway.....Troy
Stephen Emery Cook.....Ballston Spa
Earle John Corte.....Canajoharie
Mabel Dickinson.....Warrensburgh
Louis Nelson Dolbeck.....Ticonderoga

Merrill Almond Dolbeck ..... Ticonderoga
Katherine Benedicta Donohoe ..... Albany
John Leslie Everleth ..... Plattsburgh
Burton Charles Fairbanks ..... Sidney
Ferdinand Havard Franchois ..... Schenectady
Edward Graham ..... Hudson
Suren Gulian ..... Troy
Francis Tausick Heyman ..... Albany
William Holldorf ..... Amsterdam
Leslie Sedgewick Horton ..... Albany
Joseph Houseweller ..... Albany
Alvin Earl Hoyt ..... Deposit
Gilbert William Jewett ..... Watervliet
John Johnson ..... Gloversville
Charles Jordan ..... Fonda
John Thomas Kelly ..... Albany
Arthur Lester Kincaid ..... Johnstown
Walter Charles Klapper ..... Schenectady
John Charles Konieczry ..... Schenectady
Chauncey Belding Lawsing ..... Schenectady
Fred Smith Leathers ..... Hudson
William Smith Martin ..... Gloversville
Harold Hawn Mather ..... Clayton
Joseph Francis Mitchell, Jr ..... Cooperstown
Claude Ernest Montanye ..... Saratoga Springs
Warren Aurelius Montanye ..... Saratoga Springs
Robert Collier Mowitt ..... Massena
Harvey Mudge ..... Schenectady

WILLIAM NAUMOFF ..... Schenectady
JAMES JOSEPH O'KEEFFE ..... Hadley
ARCHIE MELVILLE OSBORN ..... Watertown
EDWARD MELVILLE PARKER ..... Waterbury, Conn.
CAESAR PERILLI ..... New York City
CHARLES IRVING PLACE ..... Catskill
ALVAH HARDENBURG PLACK ..... Johnsonville
WILLIAM MORISSEY PRATT ..... Albany
WILLIAM NORTHROP PURPLE ..... Albany
HAROLD HUBER RELLER ..... Albany
EDWARD CHARLES RETALLICK ..... Canajoharie
FRANK WAYNE RICE ..... Troy
GILBERT GEORGE ROBERTS ..... Burlington, Vt.
SILAS JUDSON SANFORD ..... Nicholville
CHARLES MONROE SCOVILLE ..... Hadley
CHARLES ROY SILVERNAIL ..... Dalton, Mass.
EDWIN BELL SPALDING ..... Portland, Conn.
LOUIS SPEHR ..... Albany
CARROLL WILFRED STRONG ..... Albany
WILLIAM NELSON THOMPSON ..... Williamstown, Mass.
WILLIAM IRA VAN ARMUN ..... Waterford
WARREN CARROLL VAN HOESEN ..... Schenevus
HARMON SEYMOUR VAN PATTEN ..... Schenectady
HARRY SCHERMERHORN WALKER ..... Schenectady
ALLEN HYDE WEARS ..... Madrid
JOHN PERRY WHITE ..... Delanson
STANLEY GEORGE WHITE ..... Schenectady
IRA LEWIS WILLIAMS ..... Herkimer

LEON ELDORAS WRAY.....Altona
MYRON ZUCKERMAN.....Cleveland, Ohio

Juniors—70.

Summary of Students, Union University

Union College	246
Albany Medical College	170
Albany Law School	116
Albany College of Pharmacy	104
Total	636

UNION COLLEGE

SCHENECTADY, N. Y.

ACADEMIC DEPARTMENT OF

UNION UNIVERSITY

UNION COLLEGE

Union College was incorporated by the Regents of the University of the State of New York on the 25th day of February, 1795. It was the second college incorporated in the State, and the first north of the city of New York and west of the Hudson River. It received its name from the circumstance that several religious denominations co-operated in its organization, and was the first college in the United States which was not of a strictly denominational character. It has continued from its foundation to be a representative institution of Christian unity.

The first president of Union College was the Rev. John Blair Smith, of Philadelphia. He was elected in 1795, and resigned in 1799, only a few months before his death. He was succeeded by Jonathan Edwards, the younger, who died in 1801. The Rev. Jonathan Maxcy, previously president of Brown University, succeeded Dr. Edwards, and resigned at the end of two years. In 1804 the Rev. Eliphalet Nott was elected president of Union College, which office he held until his death, on the 29th day of January, 1866. The Rev. Laurens P. Hickok, a graduate of the College, who had long acted as vice-president, was elected his successor. He resigned in 1868. The Rev. Charles A. Aiken succeeded Dr. Hickok in 1869, and resigned in 1871. The Rev. Eliphalet Nott Potter was elected president in 1871, and inaugurated June 20, 1872. On his resignation, in 1884, the Hon. Judson S. Landon, LL. D., was appointed president *ad interim*, and served until the inauguration of Harrison E. Webster, LL. D., who was elected president May 23, 1888, and inaugurated June 26, 1888. On his resignation, in January, 1894, Rev. Andrew V. V. Raymond, D. D., LL. D., was elected president, and inaugurated in June, 1894.

OFFICERS OF UNION COLLEGE

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Ex-Officio.

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EDWARD P. WHITE, A. M., Amsterdam, N. Y.

FREDERICK W. CAMERON, A. M., Albany, term of office expiring June, 1905.

Rev. PHILIP H. COLE, D. D., Syracuse, term of office expiring June, 1906.

Prof. FRANKLIN H. GIDDINGS, LL. D., 150 West 79th street, New York, term of office expiring June, 1907.

SEYMOUR VAN SANTVOORD, Troy, N. Y., term of office expiring June, 1908.

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ALUMNI ASSOCIATIONS

General Alumni Association

President, Daniel M. Stimson, LL. D., '64; *Vice-President,* Marcus T. Hun, '65; *Secretary,* Rev. W. N. P. Dailey, '84, Amsterdam; *Treasurer,* Marvin H. Strong, '96, 12 Union St., Schenectady.

Association of New York

President, Frederick W. Seward, LL. D., '49; *Vice-President,* George F. Seward, LL. D., '60; *Secretary,* Edgar S. Barney, Sc.D., '84, 36 Stuyvesant St., New York City; *Treasurer,* Clarence Johnson, '90, 96 Fifth Ave., New York City.

Association of Albany and North-Eastern New York.

President, Frederick W. Cameron, '81; *Vice-President,* Edward C. Angle, '86; *Secretary,* Robert M. Eames, '99, 54 Commercial Bank, Albany; *Treasurer,* Walter S. McEwan, '95, 461 Western Ave., Albany.

Association of Washington, D. C.

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Association of New England

President, Theodore C. Hurd, '56; *Vice-President*, Rev. Andrew W. Archibald, D. D., '72; *Secretary*, Rev. Daniel D. Addison, D. D., '83, 2 Parkman Terrace, Brookline, Mass.; *Treasurer*, Frederick T. Rogers, M. D., '80, 117 Broad St., Providence, R. I.

Association of the Genesee Valley

President, Stephen K. Williams, LL. D., '37; *Secretary* and *Treasurer*, James G. Greene, '84, 52 German Insurance Building, Rochester, N. Y.

Association of the South

President, Rev. Charles S. Vedder, D. D., LL. D., '51 Charleston, S. C.; *Vice-President*, Archibald W. Ray, '83, Columbia, S. C.; *Secretary-Treasurer*, Prof. Charles J. Colcock, '75, Charleston, S. C.

ALUMNI RECORD

The College desires to keep as full a record as possible of the residences, occupations and public services of its alumni. It also desires obituary matter. Information should be addressed to Joseph R. Brown, Jr., '02, Chairman of the Alumni Catalogue Committee, Union College Library.

FACULTY

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President

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Dean and Professor of History and Sociology

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Professor Emeritus of Modern Languages and Literature, and Lecturer on Current History

SIDNEY G. ASHMORE, A. M., L. H. D.
Professor of the Latin Language and Literature

THOMAS W. WRIGHT, A. M., PH. D.*
Professor of Mathematics

FRANK S. HOFFMAN, A. M., PH. D.
Professor of Mental and Moral Philosophy

OLIN H. LANDRETH, A. M., C. E.
Professor of Civil Engineering

WENDELL LAMOROUX, A. M.
Librarian Emeritus

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Professor of Biology and Geology

EDWARD EVERETT HALE, JR., PH. D.
Professor of English

CHARLES P. STEINMETZ, A. M., PH. D.
Professor of Electrical Engineering

*Absent on leave.

JOHN I. BENNETT, A. B.
Professor of the Greek Language and Literature

HOWARD OPDYKE, A. B.
Professor of Physics

JOHN LEWIS MARCH, A. M., PH. D.
Adjunct Professor of Modern Languages

FRANK COE BARNES, A. M., PH. D.
Adjunct Professor of Modern Languages

EDWARD ELLERY, A. M., PH. D.
Assistant Professor of Chemistry

FRANK B. WILLIAMS, C. E., M. S., PH. D.
Assistant Professor of Engineering

FREDERICK EDWARDS, C. E.
Assistant Professor of Surveying and Drafting

R. NEIL WILLIAMS, E. E.
Assistant Professor of Electrical Engineering

ELMER E. F. CREIGHTON, B. S., E. E.
Assistant Professor of Electrical Engineering

HERBERT L. TOWNE, A. B., M. D.
Instructor in Physical Culture

C. F. F. GARIS, PH. B.
Instructor in Mathematics

GORDON E. VAN LOON, A. B.
Instructor in Modern Languages

DANIEL A. YOUNG, B. S. in C. E.
Instructor in Surveying and Drafting

HAROLD W. MANSFIELD, B. S. in M. E.
Instructor in Mechanical Engineering

ROBERT B. CUNNINGHAM, A. B.
Instructor in Mathematics

JOSEPH R. BROWN, JR., B. S.
Librarian

Lecturer

HAMILTON W. MABIE, LL. D.
Lecturer on English Literature

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Assistant Treasurer
College Office

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Librarian

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Director of Gymnasium

GEORGE CLUTE
Superintendent of Grounds and Buildings

Standing Committees of the Faculty

EDUCATION—Professors Ripton, Wells, Ashmore, Wright, Hoffman, Landreth, Stoller, Hale, Steinmetz, Opdyke, Bennett, March, Ellery and Dr. Towne.

LIBRARY—Professors Ripton, Landreth, Bennett and Librarian Brown.

CATALOGUE—Professors Opdyke, Hale and Barnes.

SCHOLARSHIPS—Professors Ripton, Stoller, Bennett and Ellery.

STAGE APPOINTMENTS—Professors Wright, Stoller and Edwards.

ATHLETICS—Professors Opdyke and Bennett and Dr. Towne.

RULES—Professors Ashmore, Wright and Hoffman.

ADMISSIONS—Professors Ripton, Ashmore, Wright, Landreth, Hale, Opdyke, Bennett, March and Dr. Towne.

DISCIPLINE—Professors Ripton, Landreth, Hale, Bennett, March and Opdyke.

MUSIC—Professors Bennett and March and Mr. Garis.

PREPARATORY SCHOOLS—Professors Barnes and Ellery and Mr. Garis.

EMPLOYMENT BUREAU—Professors Stoller and Barnes and Dr. Towne.

SENIOR CLASS—Professors Hoffman, Bennett and Creighton.

JUNIOR CLASS—Professors Hale, Opdyke and R. Neil Williams.

SOPHOMORE CLASS—Professors March and Edwards and Mr. Garis.

FRESHMAN CLASS—Professors Bennett and Barnes and Mr. Van Loon.

COURSES OF STUDY

1.—Course leading to the degree of A. B.

This is the usual classical course. Latin and Greek are required for two years, and are elective for the remainder of the course. French and German are included, in addition to the ancient languages.

2.—Course leading to the degree of Ph. B.

This course offers Latin without Greek, for which is substituted additional work in modern languages and science.

3.—Course leading to the degree of B. S.

This course is based upon the study of mathematics and the sciences, with extended work in English and other modern languages.

In courses 1, 2 and 3 the greater part of the work of the last two years is elective.

4.—General Engineering course leading to the degree of B. E.

This course is intended to give the basis of an Engineering education, including the fundamental principles of all special branches of the profession, a knowledge of both French and German and a course in English.

5.—Sanitary Engineering course leading to the degree of B. E.

This differs from course 4 in substituting special work in Sanitary Engineering for some of the General Engineering studies.

6.—Electrical Engineering course leading to the degree of B. E.

This course is intended to give a broad and thorough Engineering education, with the specific instruction requisite for Electrical Engineering.

7.—Graduate course in Electrical Engineering leading to the degree of E. E.

This course, of one year's graduate study, consists of lectures, laboratory and research work, under electrical engineers of the General Electric Co., and is open to graduates of the Electrical Engineering course of Union College or of any other institution of a standing recognized by the Faculty.

Students entering with Latin and without Greek, who desire to study Greek in college, will be permitted to begin the study of Greek, with the understanding that the course is to extend through the four undergraduate years. These students will be classed as candidates for the degree of A. B.

Students having the profession of Medicine in view are permitted to take the first year studies of the Albany Medical College as a substitute for the studies of the first two terms of the Senior year in Union College. This enables medical students to lessen the time of their academic and professional studies by one year.

For tuition charges, see page 108.

ADMISSION

General Conditions

The regular entrance examinations are held on the Thursday and Friday immediately following Commencement, and on the Monday, Wednesday and Thursday of the first week of the Fall term, as indicated in the calendar; also, at the opening of any term.

Candidates are recommended to take, if possible, the uniform entrance examinations offered by the College Entrance Examination Board, which are held annually in many places. Information concerning the time and place for these examinations can be obtained by writing to *College Entrance Examination Board, Post-Office Sub-Station 84, New York, N. Y.*

Candidates must be at least sixteen years old, and, as a preliminary to the entrance examinations, they must present to the President satisfactory testimonials of character, and register (see pages 70, 71) for the necessary examinations.

Candidates from other colleges must bring letters of honorable dismissal, and must pass satisfactory examinations, or present acceptable certificates.

Candidates for a degree must enter before the close of the first Senior term.

All candidates will be examined in the English requirements, but in other subjects Regents' diplomas or certificates from schools approved by the Faculty will be accepted, if they cover the requirements. Regents' pass-cards will be accepted, if they cover all the subjects required in any department. Blank certificates, to be filled out by principals of schools, will be furnished upon application to the Dean.

Students who enter the Freshman class by certificate and fail to maintain their class standing cannot enter the next Freshman class, except by passing the entrance examinations in the departments in which they have failed.

Candidates for any other than the Freshman class are examined also in all studies previously pursued by that class.

Requirements for Examination in 1905

I. A. B. COURSE

Candidates for admission to the Freshman class in the course leading to the degree of A. B. will be examined in subjects

Nos. 1, 2, 4, 5, 6, 7 and 8, as specified below.

II. PH. B. COURSE

Candidates for admission to the Freshman class in the course leading to the degree of Ph. B. will be examined in subjects

Nos. 1, 2, 4, 5a, 6, 7 and 8, as specified below.

III. B. S. COURSE

Candidates for admission to the Freshman class in the course leading to the degree of B. S. will be examined in subjects

Nos. 1, 2, 3, 4a, 5a, 6, 7 and 8, as specified below.

For admission to this course, Latin (No. 4) may be offered, instead of a modern language (No. 5a), if desired.

IV., V. and VI. B. E. COURSES

Candidates for admission to the Freshman class in any of the courses leading to the degree of B. E. will be examined in subjects

Nos. 1, 2, 3, 4a, 5a, 6, 7 and 8, as specified below.

LIST OF SUBJECTS

1.—ENGLISH

All candidates for admission to the Freshman class will be required to pass a written examination in English, and no candidate will be admitted whose work is seriously defective in spelling, punctuation, grammar, or division into paragraphs.

Questions will be set on topics and extracts drawn from the following books. The first list consists of works to be read carefully, with a view to the absorption of the subject matter, *i. e.*, as books are generally read. The second list consists of books to be read with critical care, in annotated editions, and with reference to dictionary, grammar and rhetoric. The questions on this set will relate to literary form and logical structure, as well as to substance.

LIST (1) FOR GENERAL READING.

Shakespeare's "The Merchant of Venice" and "Julius Cæsar;" Addison's "The Sir Roger de Coverley Papers" from "The Spectator;" Goldsmith's "The Vicar of Wakefield;" Coleridge's "The Rime of the Ancient Mariner;" Scott's "Ivanhoe;" Carlyle's "Essay on Burns;" Tennyson's "The Princess;" Lowell's "The Vision of Sir Launfal;" George Eliot's "Silas Marner."

LIST (2) FOR MINUTE AND CRITICAL STUDY.

Shakespeare's "Macbeth;" Milton's "Lycidas," "Comus," "L'Allegro," and "Il Penseroso;" Burke's "Speech on Conciliation with America;" Macaulay's Essays on Milton and Addison.

Attention is called to the fact that while no examination in grammar or rhetoric, as such, will occur, yet a knowledge of the essential principles of grammar and of the elementary principles of rhetoric is involved in the above requirements. An acquaintance with the general outline of the development of English literature will also be required. Pancoast's Introduction to English Literature and Halleck's History of English Literature are recommended.

2.—MATHEMATICS

Arithmetic; Algebra, including Quadratic Equations, Proportions, Progressions and Logarithms; Plane Geometry.

In Arithmetic the examination will be on the following subjects: factors and multiples, common and decimal fractions, square root, the more important tables and operations of denominate numbers, percentage and simple interest, compound interest for integral periods only, bank discount, stocks and bonds, and the metric system.

In his preparation in Algebra the candidate should give special attention to factoring, fractional exponents and radicals, and the solution of quadratic equations by factoring and by the formula resulting from the solution of the equation $ax^2+bx+c=o$.

3.—MATHEMATICS

Solid Geometry and Plane Trigonometry.

4.—LATIN.

(a) Latin Grammar and Latin Composition (Pearson's "Exercises in Latin Composition," or an equivalent); four books of Cæsar's Gallic War, or Arrowsmith and Whicher's "First Latin Readings" (preferred); six books of Vergil's Æneid; six orations of Cicero; two thousand lines of Ovid, or Sallust's Catiline; the "Roman Method" of pronunciation.

The Grammars of West, Bennett, Lane and Morgan, Harkness (Complete Edition), Allen and Greenough, and Gildersleeve-Lodge are recommended.

(b) Roman History (as in Wolfson), Geography of Roman Empire.

4a.—PHYSICS.

An elementary knowledge of Physics, such as may be gained by a year's course of study covering Mechanics, Sound, Heat, Light and Electricity. Preparation should include individual laboratory work, attested by a note-book, comprising at least thirty-five exercises, chiefly quantitative.

For recitation work, Gage's "Elements of Physics" is recommended as a text-book.

5.—GREEK

(a) Goodwin's Greek Grammar; Pearson's "Greek Prose Composition," or an equivalent; Xenophon's Anabasis, four books; Homer's Iliad, three books, including Prosody.

(b) Greek History.

(c) The Geography of Ancient Greece.

[The attention of instructors is particularly directed to the student's need of a full and accurate knowledge of the Greek and the Latin Grammar.]

5a.—MODERN LANGUAGES

Either

German.—A knowledge of grammar, comprising declension of nouns, adjectives and pronouns; conjugation of verbs; the rules of syntax and word order; a good facility in correct pronunciation.

Ability to translate at sight a passage of German prose or poetry of ordinary difficulty, and to convert simple English sentences into German. The candidate must have read from 300 to 400 pages of prose and poetry from various standard authors. Two years' work will ordinarily be necessary to meet this requirement.

Or

French.—A knowledge of grammar, comprising the forms of nouns, adjectives and pronouns; conjugation of verbs; the rules of syntax; the more common idioms; a good facility in correct pronunciation and the ability to write from dictation.

Ability to translate at sight a passage of modern French prose or poetry of ordinary difficulty, and to convert into French simple English sentences founded upon it. The candidate must have read from 300 to 400 pages of prose and poetry from various standard authors. Two years' work will ordinarily be necessary to meet this requirement.

6.—HISTORY OF THE UNITED STATES

7.—MODERN GEOGRAPHY

8.—PHYSIOLOGY.

Requirements for Examination in 1906 and in 1907

IN ENGLISH IN ALL COURSES

LIST (1) FOR GENERAL READING.

Shakespeare's "The Merchant of Venice" and "Macbeth"; Addison's "The Sir Roger de Coverley Papers" from "The Spectator;" Irving's "Life of Goldsmith;" Coleridge's "The Rime of the Ancient Mariner;" Scott's "Ivanhoe" and "The Lady of the Lake;" Tennyson's "Gareth and Lynette," "Lancelot and Elaine," and "The Passing of Arthur;" Lowell's "The Vision of Sir Launfal;" George Eliot's "Silas Marner."

LIST (2) FOR MINUTE AND CRITICAL STUDY.

Shakespeare's "Julius Cæsar;" Milton's "Lycidas," "Comus," "L'Allegro" and "Il Penseroso;" Burke's "Speech on Conciliation with America;" Macaulay's Essays on Addison and Johnson.

IN PLANE TRIGONOMETRY IN THE B. S. AND B. E. COURSES

In 1906 and thereafter, no certificate covering the requirement in this subject will be accepted. In Plane Trigonometry, as in English, admission will be by examination only.

All other requirements as in 1905.

ENTRANCE EXAMINATIONS

1905

Entrance examinations will be held at the college in **June** and in **September**, in accordance with the schedule given below.

Only those who register at the appointed time will be admitted to the examinations of the following days.

SCHEDULE OF THE JUNE EXAMINATIONS

Thursday, June 15.

9 A. M. *Candidates will present their credentials at the office of the President and register for examination.*

11 A. M. Algebra.
Physiology.

2 P. M. U. S. History.
Physics.

4 P. M. English.

Friday, June 16.

9 A. M. Latin.
Solid Geometry.

11 A. M. German.
French.

2 P. M. Greek.
Plane Geometry.
Plane Trigonometry.

SCHEDULE OF THE SEPTEMBER EXAMINATIONS

Monday, September 18

2 P. M. *Candidates will present their credentials at the office of the President and register for examination.*

Wednesday, September 20

9 A. M.	11 A. M.	2 P. M.
Physics.	Algebra.	U. S. History.
Physiology.		3 P. M. English.

Thursday, September 21

9 A. M.	11 A. M.	2 P. M.
Latin.	German.	Greek.
Solid Geometry.	French.	Plane Geometry.
		Plane Trigonometry.

DEPARTMENTS OF INSTRUCTION

The Greek Language and Literature

PROFESSOR BENNETT

Greek is required in the course leading to the degree of Bachelor of Arts during the Freshman and Sophomore years, and may be elected during the Junior and Senior years. The aims of the course in Greek are to give the student an accurate working knowledge of the language and to acquaint him with a few of the masterpieces of Greek literature. Books treating of the history, literature, art and private life of the ancient Greeks are assigned for collateral reading.

1. **Greek Syntax.** Xenophon: The Memorabilia of Socrates. Plato: The Euthyphro. Bury's History of Greece. Gayley's Classic Myths.

   Required of Freshmen in the A. B. Course. Four hours weekly throughout the year.

2. **Plato:** The Apology, Crito and parts of the Phaedo.—**Aristophanes:** The Clouds.—**Herodotus:** Merry's Selections.—**Greek Testament:** The Gospel according to St. Luke; The Epistles to the Corinthians.—Mahaffy's Old Greek Life; Jebb's Literature; Tarbell's History of Greek Art.

   Required of Sophomores in the A. B. Course. Three hours weekly throughout the year.

3. **The Attic Orators.** Jebb's Selections; Demosthenes' De Corona.—Jebb's Attic Orators from Antiphon to Isaeus. Dickinson's Greek View of Life.

   Elective for Juniors in the A. B. Course. Three hours weekly throughout the year.

4. **Greek Poetry.** Wright and Abbot's Golden Treasury of Ancient Greek Poetry.—Jebb's Classical Greek Poetry.—Haigh's Tragic Drama of the Greeks.—Butcher's Some Aspects of Greek Genius.

   Elective for Seniors in the A. B. Course. Two hours weekly throughout the year.

5. **Pausanias:** The Periegesis; Greek text and Frazer's commentary. Thesis.

Elective for Seniors in the A. B. Course. Two hours weekly throughout the year.

Courses 3, 4 and 5 are required of candidates for special honors in Greek.

The Latin Language and Literature

PROFESSOR ASHMORE

The studies of this department are required of all Freshmen and Sophomores who are candidates for either of the two degrees, A. B. and Ph. B. In the Junior and Senior years they are elective.

1. **Freshman Latin.** Livy: Books I, XXI, XXII; Cicero: De Senectute; Tacitus: Agricola and Germania; Roman history (Botsford); Latin writing.

Required in the A. B. and Ph. B. Divisions. Four hours weekly throughout the year.

2. **Sophomore Latin.** Horace: Odes and Epodes; Terence: Andria and Adelphœ; Plautus: Captivi and Trinummus; Lectures on Ancient Comedy.

Required of Sophomores in the A. B. and Ph. B. Divisions. Three hours weekly throughout the year.

Junior Latin

3. **First Term.** Satires of Juvenal and Horace; History of Roman Literature.

Two hours weekly. Elective for Juniors in the A. B. and Ph. B. Divisions.

4. **Second Term.** Lectures on the archæology of Rome, with a study of Platner's "Ancient Rome."

Two hours weekly. Elective for Juniors in the A. B. and Ph. B. Divisions.

5. **Third Term.** Selected Letters of Pliny the Younger; Private Antiquities of the Romans.

Two hours weekly. Elective for Juniors in the A. B. and Ph. B. Divisions.

Senior Latin

6. **First Term.** Vergil: The Aeneid.

Two hours weekly. Elective for Seniors in the A. B. and Ph. B. Divisions.

7. **Second Term.** Lucretius: De Rerum Natura.

Two hours weekly. Elective for Seniors in the A. B. and Ph. B. Divisions.

8. **Third Term.** Early Latin; Inscriptions.

Two hours weekly. Elective for Seniors in the A. B. and Ph. B. Divisions.

Special courses may be arranged for Seniors intending to become teachers. One of them may be based on Gudeman's Selections from the Latin Literature of the Empire; to be substituted for (6) if desirable.

Parallel reading will be recommended according to the character of the authors and subjects named in the programme. Equivalents may be substituted in the programme at any time, at the discretion of the head of the department.

Special Honors. Candidates for Special Honors in Latin are required to take all the courses of the four years; to do additional private reading, as indicated by the department, and to prepare a thesis.

Modern Languages

French

ADJUNCT PROFESSORS MARCH AND BARNES, AND MR. VAN LOON

The study of French is required of all students. A reliable practical knowledge is the first result aimed at in all the classes, but as soon as possible the literary side of the language is brought to the front, and good books are read for what they contain. The more advanced courses vary somewhat from year to year, according to the judgment and preference of the instructors and the ability and character of the students composing the classes.

1. **Elementary French.**

   Required of Freshmen in all courses except of those students who present French at entrance. Three hours weekly throughout the year.

2. **Intermediate French.** This course is devoted to selected works of both the classical and the later periods.

   Required of Freshmen in the Ph. B., B. S. and B. E. Courses who present French at entrance. Three hours weekly throughout the year.

2a. **Intermediate French.** This course is similar to course 2.

   Required of Sophomores in the Ph. B. and B. S. Courses who take Course 1. Three hours weekly throughout the year.

3. **Advanced French.** This course is devoted to the rapid reading of modern French works.

   Elective for Juniors in the A. B., Ph. B. and B. S. Courses. Three hours weekly throughout the year.

3a. **Advanced French.** This course is devoted to a careful study of selected works of the classic period, but in any year may be a continuation of Course 3.

   Elective for Seniors in A. B., Ph. B. and B. S. Courses. Two hours weekly throughout the year.

More advanced courses, leading to special honors in French, are offered for those students who are qualified to pursue them.

German

ADJUNCT PROFESSORS BARNES AND MARCH, AND MR. VAN LOON

The courses aim to give the student a ready reading knowledge of German, a general acquaintance with its literature and preparation for post-graduate study and the use of the language after leaving college. While the literary side of the work receives chief attention after the first year, the practical is also kept in view and the study of grammatical topics and colloquial German, together with practice in writing, forms a part of every course. German is made the language of the class room whenever practicable and in some sections is used exclusively.

1. **Elementary, a.** Thomas's Practical German Grammar, Part I., with exercises and supplementary composition. Müller and Wenckebach's Glück Auf or Lange's German Method, reading and memorizing; use of German in class.

   Readings from Grimm, Andersen, Volkmann, Heyse, Hauff, Zschokke and others.

   Required in Ph. B., B. S. and B. E. Courses of Freshmen who offer French at entrance. Three hours weekly throughout the year.

2. **Intermediate, a.** Thomas's Practical German Grammar, Part II., syntax and exercises; use of German in class. Stein's German Prose Composition, conversation exercise.

   Readings—Lessing: Minna von Barnhelm; Goethe: Hermann und Dorothea; Schiller: Wilhelm Tell, Jungfrau von Orleans; Freytag: Die Journalisten; Keller: Legenden, Romeo und Julia auf dem Dorfe.

   Required in Ph. B. and B. S. courses of Sophomores who have had German 1. Three hours weekly throughout the year.

3. **Intermediate, b.** Thomas's Practical German Grammar: Rapid review of Part I., followed by thorough drill on Part II., syntax with exercises; von Hillern's Höher als die Kirche as basis for vocabulary practice, composition and conversation; written exercises from Stein's German Composition.

Readings—With modification from year to year the same as in German 2.

Required in Ph. B., B. S. and B. E. courses of Freshmen who offer German at entrance. Three hours weekly throughout the year.

4. **Elementary, b.** Thomas's Practical German Grammar, Parts I. and II., with exercises; Brandt's German Reader.

Readings—Schiller: Wilhelm Tell; Goethe: Hermann und Dorothea.

Required of Sophomores in the A. B. course. Three hours weekly throughout the year.

5. **Junior Elective, a.** A study of nineteenth century drama, development and leading representatives; lectures. Readings from Von Kleist and Grillparzer. Das junge Deutschland; lectures. Readings from Hebbel, Ludwig and Von Wildenbruch. Die freie Bühne; lectures. Nineteenth century fiction. Readings from Sudermann, Hauptmann, Meyer, Scheffel and others.

Composition. Talks on German history and legend: Stern's Geschichten von deutschen Städten.

Open to Juniors in the A. B., Ph. B. and B. S. courses who have done 2, 3 or 4. Three hours weekly throughout the year.

6. **Junior Elective, b.** Goethe and the classical period, readings, lectures (in German). Lessing: Nathan der Weise, Emilia Galotti; Schiller: Wallenstein, Maria Stuart. Outline study of the lives of these writers. Koch: Geschichte der deutschen Litteratur.

Advanced composition. Study of idioms and Sprachgebrauch.

(Alternates with course 5. Given under same conditions.)

7. **Senior Elective, a.** Goethe: (1) A study of Goethe's life and works with readings from his autobiography (Von Jagemann's Dichtung und Wahrheit) and epic writings (Bern-

hardt's Meisterwerke); Egmont, Iphigenie auf Tauris, Torquato Tasso. (2) Faust: Thomas's Faust, Part I., reading and interpretation; the Faust legend in literature.

Open to Seniors in the A. B., Ph. B. and B. S. courses who have had necessary previous training. This course will ordinarily follow course 5. Two hours weekly throughout the year.

8. **Senior Elective, b.** History of German literature from the earliest times to the present: Bernhardt's Deutsche Litteraturgeschichte in class with Vilmar's Geschichte der deutschen Nationallitteratur for reference, accompanied by Musterbuch and special readings. Two hours weekly, first half year.

A course in Middle High German: Grammar and readings, supplemented by an outline study of the history of the language. Two hours weekly, second half year.

This course alternates with course VII. and is given under the same conditions. It is expected, though not required, that those electing it will have had course VI. It is intended primarily for students who are preparing to teach German.

9. **Honor Course.** Special courses open only to members in good standing in Senior Elective German, are offered to candidates for honors in this department.

10. **Voluntary Courses.** Courses will be formed in German conversation whenever there are ten applicants and in commercial correspondence or rapid reading of recent fiction whenever there are five applicants. These courses will be given outside of schedule hours and will not count toward a degree. Open to those who have had 2, 3, or 4.

Spanish

ADJUNCT PROFESSOR BARNES

This course is designed, in the first year, to ground the student thoroughly in the grammar and in the syntactic and idiomatic peculiarities of modern Spanish and to give him a good reading knowledge of the language. In the second year a study is made

of some of the literary masterpieces and a varied course in general reading is pursued. Practice in writing is continued throughout the course.

1. **Junior Elective.** Elementary course—Outlines of grammar: reading, exercises; composition: Giese's First Spanish Book. Garner's Spanish Grammar: special drill on verbs, daily vocabulary and idioms; exercises.

   Readings—Padre Isla: Gil Blas de Santillana (Trozos escogidos); Knapp's Modern Spanish Readings; Carter and Malloy's Cuentos Castellanos; Alarcón: El Capitán Veneno.

   Open to Juniors in the A. B., Ph. B. and B. S. courses and to Seniors who have not had Spanish in Junior year. Three hours weekly throughout the year.

2. **Senior Elective.** Grammar and advanced composition; commercial correspondence and newspaper reading. Outlines of Spanish Literature.

   Literature—A. Classical period, with chief attention to the drama—Cervantes: Don Quijote de la Mancha (Trozos escogidos); Guillén de Castro: Las Mocedades del Cid; Lope de Vega; La Estrella de Sevilla; Calderon de la Barca; El Mágico Prodigioso; Tirso de Molina: Don Gil de las Calzas Verdes. B. Modern period, drama and fiction—Galdós: Marianela, Doña Perfecta; Valdés: José; Caballero: La Familia de Alvareda; Valera: Pepita Jiménez; Moratín: El Sí de las Niñas; Echegaray: El Gran Galeoto, O Locura ó Santidad. Selections from historical, political and descriptive writings.

   Open to Seniors who have had Spanish 1. Two hours weekly throughout the year.

English

PROFESSOR HALE

A. Rhetoric and Composition

1. **Freshman Rhetoric.** The work is pursued with study of a text-book, Newcomer's Elements of Rhetoric being now used.

   Required of Freshmen in the A. B., Ph. B. and B. S. courses. Two hours weekly throughout the year.

1a. **Freshman Rhetoric.** The work is pursued by lectures, dictations and written exercises. It is more logical and scientific in general character than Course 1. Required of Freshmen in the B. E. course. Two hours weekly throughout the year.

2. **Sophomore Rhetoric.** The work consists in the writing of orations with criticism and a delivery of them, either in special appointments or before the class, and the writing and criticism of essays.

   Required of Sophomores in the A. B., Ph. B. and B. S. courses. One hour weekly throughout the year.

   Required of Sophomores in the B. E. course. One hour weekly throughout the fall term.

3. **Junior Rhetoric.** The work is like that of 2, but of a more advanced character. Required of all Juniors. One hour weekly throughout the year.

4. **Argumentation and Debate.** The work follows Alden's Art of Debate, but gives a good deal of practice in preparation of briefs and arguments and in oral debates.

   Elective for Juniors in the A. B., Ph. B. and B. S. courses. Two hours weekly throughout the year.

5. **Senior Rhetoric.** The work is like that of 2, but of a more advanced character.

   Required of all Seniors in the A. B., Ph. B. and B. S. Courses. One hour weekly throughout the year.

5a. **Senior Rhetoric.** One literary essay each term. Required of Seniors in the B. E. course during the fall and winter terms.

B. The English Language and Literature

1. **Old and Middle English.** This course gives an introduction to the language in Cook's First Book in Old English, and then carries on the work in one of the following lines:

   (a.) An introduction to Beowulf.
   (b.) A reading of West Saxon prose.
   (c.) An introduction to Middle English.

   Elective for Juniors in all courses. Two hours weekly throughout the year.

2. **Sophomore English.** Shakespeare and Chaucer. A number of the plays of Shakespeare are read: at first Hamlet with particular attention to the language, action and characters, and a review of questions of text, date and sources. A view is also given of the conditions of the Elizabethan Theatre. In the winter Romeo and Juliet, King Lear and The Tempest are read more rapidly.

   The study of Chaucer aims at such acquaintance with the language and metre as is necessary to make a reading agreeable and intelligent, but will otherwise devote itself chiefly to the literary side of the matter.

   Required of Sophomores in the A. B., Ph. B. and B. S. courses. Two hours weekly throughout the year.

3. **Sophomore English for Engineers.** Like the above, with the omission of the additional plays. Required of Sophomores in the B. E. course in the fall and winter terms. Three and two hours respectively.

4. **Junior English.** The study covers, during the year, the Short Story and the Novel, the Essay, and the Oration. In each case the class follows the historical development of the literary form with especial attention to specific characteristics of the various authors, with frequent exercises.

   Required of Juniors in the A. B., Ph. B. and B. S. courses. Two hours weekly throughout the year.

5. **Senior English.** An introduction to the critical study of Poetry. The course is pursued in much the same way as 4,

except that instead of different forms of literature, different poets of the nineteenth century are studied. Tennyson, Browning, Poe, Shelley and Wordsworth are principally studied as giving examples of the chief kinds of poetic character.

Elective for Seniors in all courses. Two hours weekly throughout the year.

History and Sociology

PROFESSOR RIPTON

The work of the department covers three years, beginning with the first term of the Sophomore year. It is designed to give such a general knowledge of History, Economics and Sociology as belongs to a liberal education. At the same time sufficient work is offered in the electives to prepare those students who desire to take up graduate work in these subjects. The instruction is given by text-book, by lectures, and by library references, the students reporting the results of their reading partly during the regular work of the class, and partly in the form of essays. The subjects covered by the courses are in detail as follows:

1. **English History.** The narrative history of England is made the basis of study, but especial attention is given to the industrial, commercial and social history of the country, and to the development of the English Constitution. The importance of collateral readings from the English authorities is emphasized.

   Required of Sophomores in A. B., Ph. B. and B. S. courses. Two hours weekly, first and second terms.

2. **French History.** Beginning with a brief study of Roman Gaul, the main purpose is to show the growth of the French nation and the working of the different forces which promoted or retarded French unity. The period studied concludes with the year 1789. The history of France from that date to the present is taken up in greater detail in Course 7.

   Required of Sophomores in A. B., Ph. B. and B. S. courses. Two hours weekly, third term.

3. **American History.** A study is made of the period of American discovery and exploration and of the colonial period. The main part of the work, however, begins with an examination of the causes of the American Revolution. The course is guided by text-books and lectures, and much work is done in the library among the sources and authorities.

   Elective for Juniors in A. B., Ph. B. and B. S. courses. Three hours weekly throughout the year.

4. **French Revolution and Nineteenth Century.** This course considers the causes, ideas and progress of the French Revolution and the reconstruction of European politics and society produced by the revolutionary and Napoleonic wars. It then takes up an examination of the events and forces which contributed to the unification of Italy and of Germany, and concludes with a brief study of the Eastern Question. The course is designed to give a clear understanding of political affairs as they exist in Europe to-day and the historical processes by which they were brought about.

   Elective for Seniors in A. B., Ph. B. and B. S. courses. Three hours weekly throughout the year.

5. **Comparative Politics.** A study is made of the state and national systems of the American Government, together with the general duties and powers of the legislative, executive and judicial branches of the same. A comparative study is then made of the principal governments of Europe, with reference especially to the provisions of their present constitutions and the way in which those constitutions have developed and may be amended. The course is completed by a study of International Law, with reference especially to origin and development.

   Elective for Seniors in A. B., Ph. B. and B. S. courses. Three hours weekly throughout the year.

   In 1904-5 courses 4 and 5 are combined in one five-hour course.

6. **Economics.** It is the design of this course to give instruction in the leading principles of Economics. While a text-

book is used in order to secure more rapid progress, still the views of no school are taught exclusively. By lectures and required collateral reading an attempt is made to present the results of the latest and most approved investigations in the science. The course closes with a series of lectures upon the history of Political Economy.

Required of Seniors in all courses. Three hours weekly, first term.

7. **Sociology.** In this course the mutual relations of men in society are examined historically, that the student may learn how present conditions have resulted from past experience. Present social forces and needs are considered, with the purpose of training the students to fulfill the demands of good citizenship. The collateral reading and practical sociological investigation is guided throughout the course by lectures.

Required of Seniors in A. B., Ph. B. and B. S. courses. Three hours weekly throughout the year.

Mental and Moral Philosophy

PROFESSOR HOFFMAN

The courses in this department begin with the first term of the Junior year and extend through the entire Senior year. Logic, Experimental Psychology and Elementary Ethics come in the Junior year and are required. All the other courses are taken up in the Senior year and are elective. Instruction in the various studies of the department is usually given by means of lectures, discussions, and the use of a text-book.

1. **Logic.** This study, inasmuch as it is required, is confined to the simple elements of the science. As soon as the rules of correct thinking are mastered, the student is put at once to the analysis of arguments, the chief purpose of the study being to develop skill in detecting fallacies. Extracts from many authors are brought before the class for criticism and so far as possible they are taken from every field of thought.

Required of Juniors in the A. B., Ph. B. and B. S. courses. Three hours weekly during first term.

2. **Elementary Psychology.** This course is designed to acquaint the student with the most obvious facts of his mental experience; and the attempt is made to classify these facts into a system. The relation of Psychology to the other sciences is set forth, and the importance of the study is emphasized in that it lays the foundation for all the sciences of man as a political, moral and religious being.

   Required of Juniors in the A. B., Ph. B. and B. S. courses. Three hours weekly during second term.

3. **Elementary Ethics.** Only the outlines of the subject are presented in this course. The ordinary duties of man are pointed out by first describing those concerning himself and those that arise from his relation to others, to nature, and to God.

   Required of Juniors in the A. B., Ph. B. and B. S. courses. Three hours weekly during third term.

4. **Advanced Psychology.** The chief problems discussed in this course are the recent views concerning the nature of perception, the localization of functions and the theories concerning memory, conception, the emotions and the will. The facts of abnormal Psychology are also here considered, especially insanity, dreams, hypnotism, telepathy, and the hypothesis of a secondary self.

   Elective for Seniors in the A. B., Ph. B. and B. S. courses. Three hours weekly during first term.

5. **Advanced Ethics.** Some account of the history of Ethics is given in this course, and present ethical theories are stated and discussed. The relation of Ethics to other sciences is emphasized and much attention is given to the ethical problems involved in such questions as education, taxation, transportation, corporations, the treatment of criminals, the care of the poor, and the formation and dissolution of the family.

   Elective for Seniors in the A. B., Ph. B. and B. S. courses. Three hours weekly during second term.

6. **Evolution of Religion.** The object of this course is to show how religion originates and to trace out the steps taken in

its development. The chief ideas of the leading religions of the heathen world are critically examined, their excellencies and defects are pointed out, and a comparison of them is made with the special doctrines of the Christian system.

Elective for Seniors in the A. B., Ph. B. and B. S. courses. Three hours weekly during third term.

7. **History of Philosophy.** The attempt is made in this course to go over with considerable detail the general field of Philosophy from the earliest times down to the present day. In this way the views of the principal thinkers of the world are presented and discussed upon a great variety of problems, such as the validity of knowledge, the nature of virtue, the foundations of the State and the existence of God. Much is made in this course of the historical connection of the different systems for the purpose of impressing upon the mind of the student the successive steps that have been taken in the actual development of thought.

Elective for Seniors in the A. B., Ph. B. and B. S. courses. Three hours weekly throughout the year.

Mathematics

PROFESSOR WRIGHT, MR. GARIS AND MR. CUNNINGHAM

1. **Solid and Spherical Geometry.** Wentworth's Geometry.

Required of Freshmen in the A. B. and Ph. B. courses. Four hours weekly during first term.

2. **Algebra.** Hall and Knight's Algebra.

Required of Freshmen in the B. S. course during first term, and of Freshmen in the A. B. and Ph. B. courses during second term. Four hours weekly.

2a. **Algebra.** Hall and Knight's Algebra.

Required of Freshmen in the B. E. course. Four hours weekly during first term.

2b. **Theory of Equations,** including the elements of determinants.
Elective for Juniors and Seniors who have had 5 or 5b. Four hours weekly during first term.

3. **Trigonometry.** Taylor's Plane Trigonometry.
Required of Freshmen in the A. B. and Ph. B. courses. Three hours weekly during third term.

3a. **Trigonometry.** Taylor's Plane Trigonometry. Review.
Required of Freshmen in the B. E. course. One hour weekly during third term.

3b. **Advanced Trigonometry.** Loney's Trigonometry, Part II.
Elective for Juniors in the A. B., Ph. B. and B. S. courses. Two hours weekly throughout the year.

4. **Analytic Geometry.** Nichol's Analytic Geometry.
Required of Freshmen in the B. S. course. Three hours weekly during second and third terms.

4a. **Analytic Geometry.** Nichol's Analytic Geometry.
Required of Freshmen in the B. E. course. Three hours weekly during second and third terms.

4b. **Analytic Geometry.** Nichol's Analytic Geometry.
Elective for Sophomores in the A. B., Ph. B. and B. S. courses. Two hours weekly throughout the year.

4c. **Analytic Geometry.** Advanced course. Smith's Conic Sections.
Elective for Juniors and Seniors in the A. B., Ph. B. and B. S. courses who have had 4b and 2b. Two hours weekly during first term.

4d. **Solid Analytic Geometry.** Smith's Conic Sections.
Elective for Juniors and Seniors in the A. B., Ph. B. and B. S. courses who have had 4c. Two hours weekly during first term.

5. **Calculus.** Hall's Differential and Integral Calculus.
Elective for Sophomores in the B. S. course. Five hours weekly during first term, and three hours weekly during the second and third terms.

5a. **Calculus.** Hall's Differential and Integral Calculus.

Required of Sophomores in the B. E. course. Five hours weekly during first term, and three hours weekly during second and third terms.

5b. **Calculus.** Hall's Differential and Integral Calculus.

Elective for Juniors and Seniors in A. B. and Ph. B. courses. Two hours weekly throughout the year.

5c. **Calculus.** Advanced course. Greenhill's or Lamb's Calculus.

Elective for Seniors in the A. B., Ph. B. and B. S. courses who have had 4c and 5 or 5b. Two hours weekly throughout the year.

6. **Differential Equations.** Murray's Differential Equations.

Elective for Seniors in the A. B., Ph. B. and B. S. courses who have had 5b. Two hours weekly during third term.

Given also in Department of Engineering.

6a. **Differential Equations.** Murray's Differential Equations.

Elective for Seniors in the B. E. course. Two hours weekly during third term.

Candidates for special honors in mathematics may take course 4c, 4d, 5c or 6.

Mechanics and Physics

PROFESSOR OPDYKE

The subjects treated in the work of this department are Mechanics, Sound, Heat, Light and Electricity. A short course in Astronomy is also given.

In the A. B. and the Ph. B. courses the required work extends through the three terms of Sophomore year, and consists of lectures and recitations. This is followed by an elective course in laboratory work during either the Junior or the Senior year.

In the B. S. course the required work extends throughout the Sophomore year, and consists either of that required in the A. B

course or of that required in the B. E. course during that year. Any student choosing the latter must take also the Calculus of the B. E. course.

The courses in more detail are these:

1a. **General Physics.** This course is intended to give a general presentation of the facts and laws of Physics. No knowledge of mathematics is assumed beyond an acquaintance with Algebra and Plane Trigonometry. Experimental lectures, recitations and discussions aim to make the student familiar with the chief phenomena of Physics and their explanation.

Required of Sophomores in the A. B. and Ph. B. courses, and of those Sophomores in the B. S. course who do not also take Calculus. Three hours weekly throughout the year.

1b. **Elective in Laboratory Work.** This course is open to those who have taken 1a, and consists of individual work by the students themselves in the laboratory. The experiments performed are such as allow accurate measurement of the quantities involved; and the results obtained are used to verify some general law, or to obtain some physical constant of nature.

Elective for Juniors and Seniors in the A. B., Ph. B. and B. S. courses. Two periods of two hours each weekly throughout the year.

2a. **Experimental Physics.** This course consists entirely of experimental lectures, and is designed to serve both as a review of the Physics required for admission to the Engineering course and as an introduction to the more mathematical work of 2b.

Required of Freshmen in the B. E. course. Two hours a week throughout the year.

2b. **Mechanics and Physics.** The aim of this course is to supplement the knowledge gained in 2a. Assuming a familiarity with the facts already illustrated by experiment, more attention is here paid to a discussion of the phenomena and their mathematical analysis, in so far as this is possible

with the use of the more elementary analytical methods. The work consists of lectures, recitations and laboratory practice.

Required of Sophomores in the B. E. course, and of those Sophomores in the B. S. course who also take Calculus. Three class-room hours and one laboratory period a week throughout the first term, and five class-room hours and one laboratory period a week throughout the second and third terms.

2c. **Elective in Mathematical Physics.** This course is open to those who have taken 2b, and aims to carry out and complete the mathematical discussion of some parts of the subject. A good knowledge of Calculus is required, and an elementary knowledge of Differential Equations. Some time is devoted to a further study of Differential Equations as applied to physical problems, and through lectures and assignments of reading the student is introduced to more advanced work.

Elective for Juniors and Seniors who have taken 2b. Two hours a week throughout the year.

3. **Astronomy.** This is a general course in descriptive Astronomy, including some reference to the more elementary trigonometrical and mechanical aspects of the subject.

Required of Juniors in the General and the Sanitary B. E. courses, and in the A. B. and B. S. courses, and open as an elective to the Juniors in the Ph. B. course. Three hours a week throughout the second term.

Chemistry

ASSISTANT PROFESSOR ELLERY.

The object of the instruction in this department is to develop power of accurate observation, of logical reasoning and of forming correct judgments on observed facts. Students who are planning special courses in Chemistry, Medicine, Biology, Geology

or other branches of natural science will find the courses of great value.

1. **General Chemistry, a.** The course includes an exhaustive study of the non-metals and their compounds, together with the fundamental laws and theories of Chemistry, a special study of the common metals, and an introduction to organic Chemistry.

   Required of Freshmen in the B. S. course and of Sophomores in the Ph. B. and B. E. courses. Three hours a week lectures and two hours a week laboratory work throughout the year.

2. **General Chemistry, b.** Identical with course 1.

   Elective for Juniors and Seniors in the A. B. course.

3. **General Chemistry.** A course of lectures specially designed to give a general knowledge of the elements and their more important compounds, and of the laws and theories of Chemistry.

   Required of Freshmen in the B. E. course two hours a week throughout the year.

4. **Qualitative Analysis.** The work comprises a study of the reactions for bases and acids in solution, a complete course in blowpipe analysis, a systematic examination for metals in solution, a systematic examination for acid radicals in solution, and a systematic examination of complex solids. The aim of the year's work is to enable the student to make a complete qualitative analysis of complex inorganic substance.

   Elective for Juniors and Seniors in the Ph. B., B. S. and B. E. courses who have had course 1. Six hours a week throughout the year.

5. **Qualitative Analysis.** This course consists of laboratory work and is similar to course 4, but intended to give only a general knowledge of the theory and methods of qualitative analysis.

   Required of Juniors in the B. E. courses six hours a week during the fall term.

6. **Quantitative Analysis.** A course in which the student becomes familiar with the various gravimetric and volumetric methods of analysis.

   Elective for Seniors who have had course 4.
   Six hours a week throughout the year.

7. **Organic Chemistry.** This course comprises analysis of organic compounds, the preparation of typical organic substances, and a thorough study of the principles and theories of organic chemistry.

   Elective for all Seniors who have had courses 4 and 6. Six hours a week throughout the year.

8. **Special Analyses.** This course includes Quantitative Analysis, both gravimetric and volumetric determinations of common elements, a thorough course in Water Analysis, comprising a study of proper sanitary conditions, as well as complete chemical analysis of various samples of water, collected by the student, and a short course in milk analysis.

   Required of Seniors in the Sanitary Engineering course. two hours a week during the Fall and Winter terms.

9. **Chemical Technology.** This course consists of a series of lectures on the more important industries which make practical use of Chemical Principles, and includes a discussion of the essential Chemical Processes employed. Fuels, sewage, factory waste, the manufacture of sulphuric acid, soda, glass, salt, paper, etc., are some of the topics presented.

   Elective for Seniors, two hours a week during the spring term.

Biology and Geology

PROFESSOR STOLLER

In the study of these sciences the objects sought to be accomplished may be summarily stated as follows: 1. To broaden the student's knowledge of the world of external nature by acquainting him with the salient facts and principles of the sciences which treat of animals and plants and of the earth. 2. To train

the student in the methods of scientific study, so that he learns to acquire knowledge at first hand, that is, to observe, compare and interpret the facts and phenomena of nature and to depend upon his own powers of acquisition and understanding, rather than upon books or ready-to-hand sources of information. 3. To acquaint the student with the bearings of these sciences upon matters of practical importance, as the relation of the life processes of certain groups of organisms to human diseases, and the applications in sanitary science and therapeutics of our knowledge of these matters; the anatomy and physiology of animals, especially the vertebrates, as a foundation for human anatomy and physiology; the food and nutrition of plants with reference to agriculture; the growth of trees and the tissue structure of woods with reference to forestry, and the uses and values of timbers; the occurrences and economic values of many of the materials considered in geologic science, as building stones, mineral ores, fuels, etc., etc. 4. To afford the student a grasp of the great inductions of biologic and geologic science in their general philosophical values; the history of the earth and its organisms; the idea of evolution and the scientific evidences of a process of organic evolution; the theories of various authors as to the causal factors of the process; and, finally, the meaning of nature as an expression of creative energy.

1. **General Biology.** This course is intended to give the student a knowledge of living plants and animals, to afford mental training in the study of nature, and to give the student a grasp of the broader facts and principles of biological science in their general philosophical values. Recitations and laboratory work.

   Required of Sophomores in the B. S. course, three hours weekly throughout the year, and of Juniors in the Ph. B. course during the first two terms.

2. **Animal Morphology.** This course is adapted for students who wish a somewhat advanced knowledge and training in biology, especially as a preparation for teaching or for the medical profession. The work is mainly in the line of comparative anatomy, and includes the dissection of several ver-

tebrate types in detail. Some time is given to elementary histology and embryology, involving the technique of section-cutting, etc. The course includes the reading of texts in general zoology and embryology.

Elective for Seniors in the A. B., Ph. B. and B. S. courses. Three hours (six hours of laboratory work) weekly throughout the year.

3. **Bacteriology.** Students who have elected Course 2 may be permitted to take, in the third term, elementary practical bacteriology as an extra or in place of a part of the anatomical work.

4. **General Principles of Zoology.** The aim of this course is to use the data of zoology for their worth as contributing to liberal culture. The more general facts and principles of animal structure, function and development are reviewed and considered in their relation to the study of man. The scientific evidences of organic evolution and the theories of evolution of various authors are considered. Lectures.

Required of Juniors in the A. B., Ph. B. and B. S. courses. Three hours weekly during third term.

5. **Sanitary Biology.** In this course those organisms, especially bacteria, which bear a causal relation to disease and the recent applications in sanitary science of our knowledge of the nature of these organisms, are considered. Some laboratory work in bacteriology is done.
Required of sanitary engineers in the Senior class. Two hours weekly during the second term.

6. **General Geology.** The instruction in this course is adapted primarily to the study of the science as a branch of liberal culture, but enough practical work is included to afford a foundation for special study or for teaching. The work includes laboratory study in determining the common minerals and rocks, and some field work in structural and historical geology.

Required of Juniors in the A. B. and B. S. courses; elective in the Ph. B. course. Three hours weekly in the first term.

7. **Field Geology.** This course is supplementary to the preceding. The geological formations readily accessible from Schenectady are inspected, fossils are collected and readings from the State geological reports and other literature of the science are made.

   Required of Ph. B. students who elect the preceding course. It may be taken as an extra, by permission of the faculty, by A. B. and B. S. students who have taken the preceding course. Three hours a week during third term.

8. **Economic Geology.** In this course, after a brief study of the principles of dynamic and structural geology, the work is related to the occurrence and distribution in the United States of building stones, mineral ores, coal and other economic products. Recitations, lectures and some laboratory work. Required of Seniors in the B. E. courses. Two hours weekly during the first term.

Physiology and Physical Education

DR. TOWNE

Human Anatomy, Physiology, Hygiene and Physical Education are required in all courses. In the Freshman year the work consists of recitations, demonstrated by means of the manikin and the human skeleton. A thorough study of the human body is made, so that the student is more able to understand the benefits resulting from systematic bodily exercise.

The course in the gymnasium is so arranged as to give a practical knowledge of the different apparatus pertaining to physical training. Commencing with light work, consisting of free gymnastics, club, dumb-bell and wand exercises, the course leads through a graded series, involving heavier work as the student becomes fitted for it.

At the beginning of the second year Hygiene is taken up, the aim being to give a course which is practical. With this end in view, certain lectures are also given, in connection with the subject, on "First Aid to the Injured."

It is the aim of the department to give the student such a training in the methods of Physical Education that he may have a comprehensive knowledge of the subject, and to secure health, vigor and such harmonious development of the body as will fit it to resist disease, and prepare it for efficient service, both now and later in life.

A thorough physical examination of each student is made in the fall, and the measurements are outlined on charts, so as to show the parts below the normal development, for which special exercises suited to the health and physical condition of each individual are prescribed.

In connection with the college is a gymnasium, equipped with new apparatus and adapted to the purposes of providing excellent opportunities for physical training. It is open from 7 a. m. to 6 p. m. during the college year to all classes for voluntary work. All kinds of athletic sports are encouraged, as much as possible, under the advice and guidance of the department.

LECTURES

It is the policy of the college to provide its students with the advantages of frequent lectures by specialists in the various departments of knowledge.

THE LIBRARY.

The library occupies Nott Memorial Hall. It contains forty thousand volumes and includes the engineering and scientific library of the late Professor Gillespie, the collection of mathematical works made by the late John Patterson, of Albany; the library of the late Hon. Henry J. Cullen, of the class of 1860, and the library of ancient and classical language and literature of the late Professor Tayler Lewis. The income from a bequest of five thousand dollars left by the late Lemon Thomson, Esq., of Albany, of the class of 1850, is devoted to the purchase of books on American subjects, especially history and political science. An alcove, known as the "Thomson Alcove," is reserved

for these books. By the will of the late Rev. Oscar Blakeslee Hitchcock, of the class of 1852, a bequest of upwards of thirty thousand dollars was left to the College for the purchase of books, manuscripts, etc. The library is catalogued according to the Dewey decimal system.

One hundred and fifteen periodicals and the transactions of many learned societies are received.

Library Rules.

Hours 8-1; 2-6; 7-9 from Monday to Friday. 9-1; 7-9 on Saturday.

The library will be closed on Sunday and legal holidays.

The library will be open during vacations at hours to be announced.

Loan of books: Reference, Cullen and valuable books are not to be loaned.

Reserved books may be loaned over night, i. e., from 9 p. m. to 8 a. m. There will be a fine of $1.00 per day or part of a day for each reserved book overdue.

Periodicals are regarded as reference books.

All other books may be loaned, not more than two at a time, for a period of two weeks, and may be once renewed, unless called for. A fine of ten cents per day will be charged for all books overdue and all library privileges will be withdrawn until the book is returned and the fine paid.

THE NATURAL HISTORY MUSEUM

PROFESSOR STOLLER, CURATOR

It is expected that during the current year the main body of the collections will be transferred to the third floor of Nott Memorial Hall. The opportunity will be used, as far as possible, to rearrange them, and to set them in order with reference to their preservation and their educational use.

In Zoology, the collection of mounted birds numbers 311 specimens, representing 161 species of the bird fauna of the Eastern United States. These have recently been carefully inspected, and will be reclassified and labelled. Of mammals there is a collec-

tion of 57 skins, the gift of the U. S. National Museum, and a number of skulls, skeletons and mounted specimens. Fishes, amphibia and reptiles, especially of the local fauna, are represented by specimens in alcohol. In the department of invertebrates the collections of marine animals made by Dr. Harrison E. Webster are extensive, including sponges, corals, worms, crustacea and mollusks, the total number of species represented being over 5,000. The Wheatley collection of shells, presented by E. C. Delavan, Esq., consists of 8,000 specimens. The botanical collections include a nearly complete set of local flowering plants, the work of Professor Jonathan Pearson. To this there has since been added a complete set of the ferns and fern allies of Schenectady County. The flora of the United States is further represented by collections from Virginia, the Red River region of the Southwest, and those made by Dr. Nevius in Alabama. The lower cryptograms are represented by a valuable collection of 2,300 specimens of fungi, the gift of Mr. J. B. Ellis, of the class of 1851. The Herbarium also includes a considerable number of foreign plants, including representative collections from Germany, Spain, Asia Minor and England, as well as some specimens from Iceland, Norway, France and Switzerland. They have been sorted and distributed in a single series following the latest accepted sequence, that of Engler and Prantl's Natürliche Pflanzenfamilien, making the entire collection of some 8,000 or 10,000 specimens readily accessible for reference and study.

In Mineralogy, the Wheatley collection of minerals given by E. C. Delavan, Esq., which is labelled according to the system of Dana, contains 4,000 specimens, many of which represent the more valuable forms.

In Geology there is a general collection of rocks and minerals, comprising some 3,000 specimens; and a considerable collection of Paleozoic and Mesozoic fossils. The collections made by the geological department under the direction of Professor C. S. Prosser so increased the museum that there is plenty of material now available, especially, for the careful study of the Paleozoic rocks and fossils of the New York formations.

Recently there has been added the educational series of rock specimens, the gift of the United States Geological Survey.

CURRICULUM OF THE A. B. COURSE[1], 1904-1905.

	First Term	Second Term	Third Term
Freshman Year	4 Greek 4 Latin 3 French 2 Rhetoric 4 Solid Geometry 1 Physiology Greek Prose Composition Latin Prose Composition	4 Greek 4 Latin 3 French 2 Rhetoric 4 Algebra 1 Physiology 1 Gymnastics Greek Prose Composition Latin Prose Composition	4 Greek 4 Latin 3 French 2 Rhetoric 3 Trigonometry 1 Physiology 1 Gymnastics Greek Prose Composition Latin Prose Composition
Sophomore Year	3 Greek 3 Latin 3 German 2 English and Rhetoric 2 History or Mathematics 3 Physics 1 Hygiene	3 Greek 3 Latin 3 German 3 English and Rhetoric 3 Physics 2 History or Mathematics	3 Greek 3 Latin 3 German 3 English and Rhetoric 3 Physics 2 History or Mathematics
Junior Year.	3 English and Rhetoric 3 Logic 3 Geology 7 Elective[2]	3 English and Rhetoric 3 Psychology 3 Astronomy 7 Elective[2]	3 English and Rhetoric 3 Ethics 3 Evolution 7 Elective[2]
Senior Year	1 Rhetoric 3 Economics 13 Elective[2]	1 Rhetoric 3 Sociology 13 Elective[2]	1 Rhetoric 3 Sociology 13 Elective[2]

[1] The figure at the left indicates the number of hours per week devoted to class work in the subject.

[2] For list of electives, see pages 102, 103.

CURRICULUM OF THE PH. B. COURSE[1], 1904-1905.

	First Term	Second Term	Third Term
Freshman Year	4 Latin 3 German 3 French 2 Rhetoric 4 Solid Geometry 1 Physiology Latin Prose Composition	4 Latin 3 German 3 French 2 Rhetoric 4 Algebra 1 Physiology 1 Gymnastics Latin Prose Composition	4 Latin 3 German 3 French 2 Rhetoric 3 Trigonometry 1 Physiology 1 Gymnastics
Sophomore Year	3 Latin 3 German or French 2 English and Rhetoric 2 History or Mathematics 3 Physics 3 Chemistry 1 Hygiene	3 Latin 3 German or French 3 English and Rhetoric 3 Physics 2 History or Mathematics 3 Chemistry	3 Latin 3 German or French 3 English and Rhetoric 3 Physics 2 History or Mathematics 3 Chemistry
Junior Year.	3 English and Rhetoric 3 Logic 3 Biology 7 Elective[2]	3 English and Rhetoric 3 Psychology 3 Biology 7 Elective[2]	3 English and Rhetoric 3 Ethics 3 Biology 7 Elective[2]
Senior Year	1 Rhetoric 3 Economics 13 Elective[2]	1 Rhetoric 3 Sociology 13 Elective[2]	1 Rhetoric 3 Sociology 13 Elective[2]

[1] The figure at the left indicates the number of hours per week devoted to class work in the subject.

[2] For list of electives, see pages 102, 103.

CURRICULUM OF THE B. S. COURSE[1], 1904-1905.

	First Term	Second Term	Third Term
Freshman Year	3 French 3 German 2 Rhetoric 4 Algebra 3 Chemistry 1 Physiology	3 French 3 German 2 Rhetoric 3 Analytic Geometry 3 Chemistry 1 Physiology 1 Gymnastics	3 French 3 German 2 Rhetoric 3 Analytic Geometry 3 Chemistry 1 Physiology 1 Gymnastics
Sophomore Year	3 German or French 2 English and Rhetoric 2 History 5 Calculus } [2] 4 Mechanics and Physics }	3 German or French 3 English and Rhetoric 2 History 3 Calculus } [2] 6 Mechanics and Physics }	3 German or French 3 English and Rhetoric 2 History 3 Calculus } [2] 6 Physics }
Junior Year.	3 English and Rhetoric 3 Logic 3 Geology 7 Elective[3]	3 English and Rhetoric 3 Psychology 3 Astronomy 7 Elective[3]	3 English and Rhetoric 3 Ethics 3 Evolution 7 Elective[3]
Senior Year	1 Rhetoric 3 Economics 13 Elective[3]	1 Rhetoric 3 Sociology 13 Elective[3]	1 Rhetoric 3 Sociology 13 Elective[3]

[1] The figure at the left indicates the number of hours per week devoted to class work in the subject.

[2] Or 3 hours Physics, 3 hours Chemistry and 3 hours Biology.

[3] For list of electives, see pages 102, 103.

LIST OF ELECTIVES FOR ALL COURSES, 1904-1905.

[For limiting conditions, see statements of respective departments.]

JUNIOR YEAR[1].

First Term	Second Term	Third Term
2 Greek	2 Greek	2 Greek
2 Latin	2 Latin	2 Latin
3 German	3 German	3 German
3 French	3 French	3 French
3 Spanish	3 Spanish	3 Spanish
2 Anglo-Saxon	2 Anglo-Saxon	2 Anglo-Saxon
2 Advanced Rhetoric—Argumentation	2 Advanced Rhetoric—Argumentation	2 Advanced Rhetoric—Argumentation
3 American History	3 American History	3 American History
2 European History	2 European History	2 European History
2 Theory of Equations or Calculus	2 Advanced Trigonometry or Calculus	2 Mathematical Physics
2 Mathematical Physics	2 Mathematical Physics	3 General Chemistry[2]
3 General Chemistry[2]	3 General Chemistry[2]	3 Qualitative Analysis
3 Qualitative Analysis	3 Qualitative Analysis	3 Quantitative Analysis
3 Quantitative Analysis	3 Quantitative Analysis	3 General Geology
3 General Geology	3 General Geology	3 Biology[3]
3 Biology[3]	3 Biology[3]	3 Geology, Astronomy, Evolution[4]
3 Geology, Astronomy, Evolution[4]	3 Geology, Astronomy, Evolution[4]	

[1] The figure at the left indicates the number of hours per week required for class work.

[2] For the A. B. course. [3] For the B. S. course. [4] For the Ph. B. course.

LIST OF ELECTIVES FOR ALL COURSES, 1904-1905.

[For limiting conditions, see statements of respective departments.]

SENIOR YEAR[1].

First Term	Second Term	Third Term
2 Greek	2 Greek	2 Greek
2 Latin	2 Latin	2 Latin
2 Spanish	2 Spanish	2 Spanish
2 German or French	2 German or French	2 German or French
2 English Poetry	2 English Poetry	2 English Poetry
3 Comparative Politics	3 Comparative Politics	3 European History
3 European History	3 European History	3 International Law
3 History of Philosophy	3 History of Philosophy	3 Evolution of Religion
3 Advanced Psychology	3 Advanced Ethics	3 History of Philosophy
2 Advanced Calculus	2 Advanced Calculus	2 Differential Equations
2 Mathematical Physics	2 Mathematical Physics	2 Mathematical Physics
2 Physical Laboratory	2 Physical Laboratory	2 Physical Laboratory
3 General Chemistry[2]	3 General Chemistry[2]	3 General Chemistry[2]
3 Qualitative Analysis	3 Qualitative Analysis	3 Qualitative Analysis
3 Quantitative Analysis	3 Quantitative Analysis	3 Quantitative Analysis
3 Organic Chemistry	3 Organic Chemistry	3 Organic Chemistry
3 General Geology	3 General Geology	3 General Geology
3 Invertebrate Morphology	3 Vertebrate Anatomy	3 Comparative Vertrebrate Anatomy

[1] The figure at the left indicates the number of hours per week required for class work.

[2] For the A. B. course.

FOR THE

CURRICULUM

OF THE

B. E. COURSES

See pages 158–162.

GENERAL REGULATIONS

Registration. Every student must report at the Registrar's office at the beginning of each term and register college or local residence. Any change of residence during the term must be reported at once, in conformity with the regulation made by the Treasurer's office.

Residence. Students are not allowed to change their college rooms during the term without permission of the Treasurer; for every change the sum of two dollars is charged. Students must conform to college rules regarding keys.

Reports. A daily record of scholarship and of attendance at class and chapel is kept, and is transmitted at the close of each term, or more frequently, to the student's parent or guardian.

Standing. There are four grades of scholarship:—from 9 to 10 inclusive, first grade; from 8 to 8.9, second grade; from 7 to 7.9, third grade; from 6 to 6.9, fourth grade. A student who receives a mark of 4 to 5.9 is reported as conditioned; below 4, as failed. In the mathematical studies of the engineering course the sustaining mark is 7, and any mark below 5 indicates failure.

A student who is reported as having failed in any subject must take that subject again in class.

Those receiving the three highest marks for the whole course in the Engineering Department and the seven highest marks in the other departments are entitled to appointment as Commencement Orators.

Absences in General. Absences are recorded as of three kinds—permitted, excused and unexcused. No one but the President or Dean can authorize the record of an absence as permitted.

Absences are entered (in every course) against a student from the beginning of a term until he reports his return to the Registrar. A like report is required after absence because of sickness or permission.

Class-room Absences. Students will be allowed, each term, as many absences without excuse, in any subject, as there are recitations per week in that subject.

After this limit has been reached, each additional unexcused absence will be marked as a failure in recitation, and one or more excused absences will subject the student to a special preliminary examination before he can proceed to his regular examination.

After a number of unexcused absences equal to three weeks of recitations in any subject, the student will not be allowed to continue his work in that subject, but must take it with the succeeding class.

No excuse will be granted except for protracted illness, or for reasons in every way exceptional.

This rule does not apply to examinations, or to recitations just before or after any vacation or recess, or to any class as a whole at any time, and is not to be interpreted as remitting any part of the total work of the term.

Chapel Absences. Ten absences without excuse will be allowed each term. All absences after the first ten lower the standing at the rate of one unit for every two absences.

No absences will be excused except for protracted illness or for reasons in every way exceptional.

In the determination of a student's general standing marks for chapel attendance are counted as the equivalent of a one hour per week recitation. They affect the granting of scholarships and the selection of honor men.

Conditions. Students admitted with entrance conditions are required to remove them not later than the examination for the removal of conditions in the following March. Students who fail to meet this requirement are classed as irregular students. No student who has any conditions unsatisfied at the close of the first condition examination of the college year will be permitted to continue with his class without the express authorization of the Faculty. Conditions not removed at the next conditions examination held after their imposition must be made up in class at the first opportunity, and this work shall take precedence of

the regular work in case of conflict in the schedule. No Senior who has failed to make up all his back work by the end of the second term of Senior year can be recommended for a degree, except by special vote of the Faculty.

Examinations for the removal of conditions occur on the first Saturday of the Fall term, and on the first Saturday in December, March and May, as indicated in the College calendar. Registration for these examinations closes at noon on the Wednesday next preceding the date set for each. A fee for each examination to be taken must be paid at the time of registration, at the College Office.

Students who have been excused from any term examination may be examined later, at the option of the instructor, but such examination cannot be postponed beyond the first condition examination. A failure to pass will be regarded as a condition which must be made up at the next following conditions examination.

A failure to report at any appointed examination will be regarded as a trial, unless previously excused.

No student will be reported "Not examined," unless excused in writing by the Dean. Without this excuse, students absent from term examinations will be reported as "Not sustained", or "Failed."

Any student permitted by the Faculty to anticipate or defer a term examination will be required to pay a fee for each special examination made necessary.

Irregular Students. Irregular Students have no class relation or class privilege; they are debarred from competition for prizes and from the attainment of special honors.

Changes of Course. Students are not permitted to pass from one course to another, or to take any studies out of their regular order, without the specific authorization of the Faculty.

The evidence that a student's continuance in college is resulting in no advantage to himself, or in harm to others, will occasion his separation from the institution.

EXPENSES

Matriculation fee	$ 5 00
Tuition, per term	25 00
Graduate course in Electrical Engineering, tuition per term	50 00
Room rent, per term, North College.....$13 50 to	20 00
South College, per term	20 00
Incidental fee, for maintenance of grounds and public rooms, use of library, gymnasium, etc., per term	8 00
Graduation fee, including diploma	15 00
Chemical laboratory fees:	
Required course in Experimental Chemistry, No. 3, Freshman year, per term	2 00
Required course, No. 1 or No. 2, per term	6 00
Required course, No. 5, in Civil, Sanitary and Electrical Engineering, Junior year	13 00
Required course, No. 8, in Sanitary Engineering, Senior year	13 00
Elective courses, No. 4, No. 6 or No. 7, per term	13 00
Electrical Engineering laboratory fee, per term....$2 00 to	10 00
Biological laboratory fees:	
Required course, No. 1, per term	2 00
Required course, No. 5, per term	3 00
Elective courses, No. 2 or No. 3, per term	6 00
Physical laboratory fees:	
Required course, No. 2b, per term	3 00
Elective course, No. 1b, per term	5 00
Conditions examination fee	2 00
Fee for certificate of work done	2 00
Fee for certificate of graduation	1 00

Students who take part of their Senior year's work at the Albany Medical College, as provided on page 63, are charged $125 for the year's tuition, $50 to be paid to the Treasurer of Union College and $75 to the Treasurer of the Albany Medical College.

Tuition and other fees are due on the first day of each term.

Students must conform to the rules of the Treasurer's office regarding registration at the opening of each term, and will not

be admitted to any classes or laboratories until the required fees are paid.

No deductions are made because of absence from college.

No part of a term bill will be refunded for any cause.

Damage done by students to College property will be charged to their account.

It is the custom of the student body to levy an annual campus tax of ten dollars, five dollars of which is payable at the beginning of the fall term, three dollars at the beginning of the winter term, and two dollars at the beginning of the spring term. This money is used for the support of the different branches of athletics consisting at present of foot ball, base ball and track.

room-mates before the College year opens. When this is not done the men will be located in the order of application. At the end of the College year students giving up their rooms for any reason whatsoever must remove all furniture and property from their rooms not later than the Saturday following Commencement Day, as after this time the dormitories will be closed until the Saturday before the first registration day of the Fall term. The dormitories will also be closed during the Christmas recess.

Students leaving property in their rooms during the vacations do so at their own risk.

EXPENSES

Matriculation fee	$ 5 00
Tuition, per term	25 00
Graduate course in Electrical Engineering, tuition per term	50 00
Room rent, per term, North College.....$13 50 to	20 00

Fee for certificate of work done	2 00
Fee for certificate of graduation	1 00

Students who take part of their Senior year's work at the Albany Medical College, as provided on page 63, are charged $125 for the year's tuition, $50 to be paid to the Treasurer of Union College and $75 to the Treasurer of the Albany Medical College.

Tuition and other fees are due on the first day of each term.

Students must conform to the rules of the Treasurer's office regarding registration at the opening of each term, and will not

be admitted to any classes or laboratories until the required fees are paid.

No deductions are made because of absence from college.

No part of a term bill will be refunded for any cause.

Damage done by students to College property will be charged to their account.

No degree, certificate or dismissal will be given to any student until his bills are paid.

Board can be procured for $3 to $4 a week. The total expense of tuition, room, text-books, board, lights, washing, etc., during the three terms is from $300 to $400.

College Rooms

The College has two steam heated dormitories, accommodating ninety students. Most of the rooms are arranged in suites of two, and all are unfurnished; they are rented at prices varying from $40.50 to $60.00 per year for each student occupying a room. The rooms are cared for by competent persons, employed and paid by the College. No room is secured until a lease is signed and filed in the College Office. A student must occupy the room for which he signs, as transfers are not allowed. Each occupant of a College room will be held responsible for any damage done to the room. Students about to enter College who wish rooms in the dormitories should make early application to Charles B. Pond, Assistant Treasurer. On application, a list of the rooms, giving location and price, will be furnished. It is very desirable that students about to enter College should secure their own room-mates before the College year opens. When this is not done the men will be located in the order of application. At the end of the College year students giving up their rooms for any reason whatsoever must remove all furniture and property from their rooms not later than the Saturday following Commencement Day, as after this time the dormitories will be closed until the Saturday before the first registration day of the Fall term. The dormitories will also be closed during the Christmas recess.

Students leaving property in their rooms during the vacations do so at their own risk.

SCHOLARSHIPS

Funds given especially for this purpose enable the College to offer aid to a number of students each year, as follows:

General Scholarships

Available for students in the A. B., Ph. B. and B. S. courses.

Scholarships covering a part or the whole of tuition charges are granted to students upon the following conditions:

1. The declaration of a purpose to remain in Union College until graduation. (Credentials necessary for admission to another college will not be given to any scholarship student until he has repaid to the college treasury the full amount of scholarship aid received.)
2. An acknowledgment that the aid received is regarded as a debt of honor, to be paid as soon as possible after leaving college.
3. The presentation of satisfactory evidence of financial need.

Scholarship aid will be withdrawn temporarily upon the failure of the student to be sustained in any subject, or upon his failure to maintain an average grade of eighty per cent. in the studies of any term, and after it has been withdrawn for three successive terms it will not be renewed.

Any serious breach of college discipline, evidence of moral delinquency, or repeated unnecessary expenditures will also result in the withdrawal of scholarship aid.

Application blanks will be provided by the President or Dean upon request.

John David Wolfe Memorial Scholarships

The income of a Fund of Fifty Thousand Dollars established by the generosity of Miss Catharine Lorillard Wolfe is designed to aid students from the Southern States.

The scholarships are governed by the conditions named above.

Application blanks will be provided by the President or Dean upon request.

Levi Parsons Scholarships

A generous benefaction by the late Hon. Levi Parsons, of Gloversville, N. Y., maintains several scholarships in each class, yielding about one hundred and fifty dollars a year, each; this provides for tuition and a money payment each term.

Among applicants, preference is given:

First, to blood relatives of the founder, bearing his name and living in the county of Fulton, Montgomery or Hamilton, in the State of New York, and especially to those bearing his name and living in Gloversville or Johnstown, Fulton County.

Second, to applicants living in the following places, according to the following order:

1. The city of Gloversville, Fulton County
2. The city of Johnstown.
3. The township of Johnstown.
4. The county of Fulton.
5. The adjoining counties of Montgomery and Hamilton.
6. To blood relatives living in any other part of the United States.

Nomination to scholarships is made by the Board of Directors of the Gloversville Free Library; and the nominees must pass satisfactory examinations at the College. Applications are received by the Directors of the Gloversville Free Library, Gloversville, N. Y.

These scholarships are governed by the conditions named on page 110.

Thomas Armstrong Scholarships

The late Thomas Armstrong of Plattsburgh, N. Y., provided for the grant of scholarships to residents of Clinton County, sons of practical farmers. Nominations to these scholarships are made by the Board of Supervisors of Clinton County, and the yearly value of each scholarship is not to exceed two hundred dollars.

R. C. Alexander Prize Scholarship

The sum of four thousand dollars has been given in memory of the late Robert Carter Alexander, of the class of 1880, and a life trustee of the College, to be devoted to the establishment of a scholarship for the encouragement of classical studies.

The income of this fund, amounting to two hundred dollars per year, will be awarded as a prize scholarship, upon the following conditions:

Conditions
governing the award of the R. C. Alexander Prize Scholarship.

1. Candidates must be students in the Classical course, and of approved moral character.

2. They must be free from conditions, and must have obtained an average of at least eighty per cent. in the studies of the first two terms of the Freshman year.

3. They must pass successfully a special examination at the close of the Freshman year in each of the following subjects: Latin, Greek, Mathematics, English Composition, and either French or German. These examinations will be based upon the work of the Freshman year.

4. The award will be made to the candidate obtaining the highest general average in these examinations and in all the previous work of his college course.*

5. The Prize Scholarship will be forfeited upon evidence of moral delinquency, or upon failure to maintain an average grade of ninety per cent. in the work of any subsequent term. The scholarship, once lost, cannot be regained, but will be awarded, upon the above conditions, to a student in the next entering class.

6. All questions pertaining to the administration of this scholarship will be determined by a committee composed of the President of the College, the Chairman of the Scholarship Committee of the Faculty, and a member of the Board of Trustees.

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*This scholarship is now held by Harry Cook, of the class of 1906, and will next be awarded to a member of the class entering in the fall of 1905.

PRIZES

Blatchford Oratorical Medals

The Hon. Richard M. Blatchford, LL. D., of New York city, founded oratorical prizes, consisting of two gold medals of the value of the interest on $1,000, which are given to the two members of the graduating class who deliver at Commencement the best orations, "regard being had alike to their elevated and classical character and to their graceful and effective delivery." These medals are awarded by a committee appointed by the Trustees, and are presented at the close of the exercises.

Warner Prize

The Hon. Horatio G. Warner, LL. D., of Rochester, N. Y., founded an annual prize, consisting of silver plate of the value of $28, to be presented at Commencement to the "graduate of Union College, Classical course, who shall reach the highest standing in the performance of collegiate duties, and also sustain the best character for moral rectitude and deportment, without regard to religious practice or profession." The prize is awarded by the Faculty.

Ingham Prize

The Hon. Albert C. Ingham, LL. D., of Meridian, N. Y., founded an annual prize of the interest on $1,000 (in the form of plate, or medal, or money, or both medal and money, as preferred), to be awarded at Commencement to that Senior connected with the College for not less than two years who shall offer the best essay on one of two assigned subjects in English Literature or History.

The essay must be typewritten, and must contain not less than 4,000 nor more than 4,500 words. Its signature (fictitious) and the writer's real name must be enclosed in a sealed envelope; the signature and the name of the prize being given on the outside. The essay, with the note, must be presented by noon on the fifteenth day of May.

Allen Essay Prizes

The Hon. William F. Allen, LL. D., of Oswego, N. Y., established a fund of $1,000, the interest of which is devoted to prizes for the best three essays on any subject, submitted by members of the Senior class.

The essay must be typewritten, and must contain not less than 2,500 nor more than 3,000 words, and must be signed and presented (with note, as in the case of the Ingham Essay) by noon on May 15th. The prizes are awarded at Commencement.

The Rankine Prize for Extemporaneous Speaking

A prize of $50 in money is awarded to that member of the College who shall deliver the best extemporaneous speech at a public competition to be held in Commencement week in each year. The award is made by a committee, appointed by the donor, and is based on the following considerations: (1) The appropriateness and correctness of the subject matter; (2) the logical force of the argument; (3) the excellence of the style; (4) the grace and effectiveness of the delivery. All students in regular standing are eligible. The number of competitors is, however, limited to ten.

Oratorical Prizes

Prizes are presented at Commencement to the two Juniors and the two Sophomores who deliver the orations best in composition and delivery on the occasion of Prize Speaking in Commencement week. Four Juniors and four Sophomores are selected for this competition by a committee of the Faculty on the fifteenth of April. Candidates must be in full standing on appearance before the committee.

Allison-Foote Prize

Founded by George F. Allison, of New York city, and Wallace T. Foote, of Port Henry, N. Y., for the encouragement of debate in the Literary Societies. The prize consists of $100 in cash, and is to be awarded as the result of a public competition between representatives of the Adelphic and Philomathean Literary Soci-

eties. Fifty dollars will be awarded to the society presenting the strongest argument. The remaining $50 will be awarded to the debater who makes the best single speech, regardless of his society relations. Contestants must have engaged in at least ten debates in their respective societies during the college year immediately preceding. All further details are to be left to the determination of a committee, consisting of the President, the Dean of the College, and the Professor of Rhetoric.

Daggett Prize

In 1899 Miss E. Josephine Daggett bequeathed to Union College the sum of $1,000, the interest of which is devoted to a prize for conduct and character, without respect to scholarship, to be given at Commencement to a Senior who shall have passed through a full course of four years at the College.

LAW SCHOOL SCHOLARSHIPS

Applicants for these scholarships, described below, must register at the college office by May 1st of Senior year.

John K. Porter Memorial Scholarships

A fund given by Mrs. John K. Porter, in memory of her husband, is designed to assist students who, after graduating from college, pursue the study of law. The fund provides, at present, for three scholarships of ninety dollars each. The awards will be made at Commencement to Seniors chosen by the Faculty.

Gilbert M. Speir Memorial Scholarship

A fund given by Mrs. Glover C. Arnold, in memory of her father, the late Judge Gilbert M. Speir, provides another scholarship for students of law who go from Union College to the Albany Law School, another department of Union University.

The sum of ninety dollars will be awarded at Commencement to the Senior chosen by the Faculty, the choice being made on the basis of excellence in historical studies.

DEGREES AND HONORS

Degrees

The degrees of the College are conferred in harmony with a resolution of the Board of Trustees, which says: "The successful completion of the Classical course [Course 1, page 62] shall entitle the student to the degree of Bachelor of Arts; of the Latin-Scientific course [Course 2, page 62] to the degree of Bachelor of Philosophy; of the Scientific course [Course 3, page 62] to the degree of Bachelor of Science; of one of the Engineering courses [Courses 4, 5, 6, pages 62 and 63] to the degree of Bachelor of Engineering; of the Graduate course in Electrical Engineering [Course 7, page 63] to the degree of Electrical Engineer. The candidate for a degree must have entered college before the close of the first Senior term, must have paid all dues to the College Treasurer, and returned all books borrowed from the Library. He must also attend the conferring of Degrees, or be expressly excused therefrom.

The degree of Master of Arts or of Master of Science will be given to graduates of Union College who have been registered as candidates for the degree not less than two years, have completed definite courses of advanced study in two departments, and have submitted a satisfactory thesis and passed satisfactory examinations. The total amount of work done is intended to be the equivalent of one year of resident study.

A year of resident study in any non-professional graduate school, approved at the time of registration by the two departments concerned, will be accepted instead of the two years' study above mentioned on fulfilment of the same conditions regarding thesis and examinations.

Each candidate for this degree must register his name, address, and the two departments chosen, with the Dean of the College not later than the fifteenth of October of the year for which he desires registration.

The thesis must be presented to the Dean by May 1st for submission to the Faculty in time to provide for all necessary examinations before commencement.

A fee of $20 is charged, which covers examinations and diploma; of this amount $10 is payable at the time of registration and $10 at the time of the final examinations.

Honors

All commencement prizes are limited to A. B., Ph. B., or B. S. students who have entered at or before the beginning of the Senior year, and who are in full standing at the close of the second term; and to Engineering students entered likewise and in full standing at the close of the second term, in both the Engineering course and the English department of the B. S. or Ph. B. course.

Commencement Appointments

These honors are assigned to ten Seniors on the basis of scholarship, as stated under Standing, page 105. Provisional appointments are made at the close of the second term Senior, and become final if those who receive them retain the same relative rank to the end of their course. Under present regulations, no other persons can become competitors for the Blatchford Oratorical Medals.

Seniors not in full standing at the close of the second term shall be considered ineligible to a Commencement appointment.

Places gained as the result of the third term's work shall be on the excused list, unless ordered otherwise by special vote of the Faculty.

The Valedictory

This honor is awarded to the Senior of highest standing among the ten receiving Commencement appointments.

Special Honors

Special Honors are also given at graduation in each of the following subjects: Greek, Latin, English, French, German, Mathematics, Physics, Chemistry, Biology, Economics, History, Sociol-

ogy and Philosophy. The work required in each case will be the equivalent of three terms of class-room work of two hours per week each and will be outside of the prescribed or elective courses. The candidate for Special Honors must apply to the head of the department in which he proposes to take Honors not later than the first Monday of the Spring term of the Junior year. He must attain in all the studies of the department in which he tries for Honors a rank of not less than ninety per cent. of the maximum. The evidence that he has successfully completed the extra course prescribed for him must be submitted not later than June 1st of the Senior year to the Faculty, who shall decide in each case whether the work done is worthy of an Honor. The Honors attained are stated in the diploma, and the names of the students who take Honors are printed on the Commencement programme.

DEGREES CONFERRED

AT THE

ONE HUNDRED AND EIGHTH ANNUAL

COMMENCEMENT

June 10, 1904

HONORARY

D. C. L.

William Croswell Doane.....Albany, N. Y.

LL. D.

Amasa J. Parker.....Albany, N. Y.

Daniel M. Stimson.....New York, N. Y.

D. D.

Townend Glover Jackson.....Brooklyn, N. Y.

L. H. D.

Denis Wortman.....Orange, N. J.

A. M.

Van Vechten Veeder.....New York City.

IN COURSE

A. B.

Bert W. Roy, as of class of 1903.....Clyde, N. Y.

CLASS OF 1904.

A. B.

WALTER EDWARD BEADLE..... Cooperstown.
CLAUDE NORTON BROWN..... Barnersville.
THADDEUS GUILFORD COWELL..... Albany.
J. LEWI DONHAUSER..... Albany.
CORNELIUS LANSING HAYS..... Albany.
JAMES FULLER LAWSING..... Schenectady
CARL ESSYLSTYNE MCCOMBS..... Frankfort.

Ph. B.

STEPHEN CALKIN FIERO..... Katsbaan.
WILLIAM HENRY GUARDINIER..... East Springfield.
EDWARD D. GREENMAN..... Albany.
ANDREW WRIGHT LENT..... Highland.
LUKE FRANCIS LOVELOCK..... Troy.
JOHN ALOYSIUS MAHAR..... Rensselaer.
GEORGE EARL SMITH..... Schenectady.
CHARLES GOWDY STILES..... Lansingburgh.
WILLIAM CARL TREDER..... Albany.

B. S.

JOSEPH GILBERT COOL..... Glens Falls.
ELBERT VERITY MULLENNEAUX..... Albany.
HENRY SEYMOUR OLMSTED..... Chattanooga, Tenn.
ELBERT THEODORE RULISON, JR..... Schenectady.
ARCHIBALD HAMILTON RUTLEDGE..... Santee, S. C.

B. E.

WILLIAM CLARK DURANT..... Saratoga Springs.
LELAND WESLEY IRISH..... Caldwell.
JAMES EDWARD MOLONY..... Schenectady.
LAFAYETTE CLOW REYNOLDS..... Schenectady.
GEORGE VAUGHN SHERRILL..... Sandy Hill.
ROWLAND STEBBINS..... New York.
WINSLOW BARNES WATSON..... Plattsburgh.
HARRY ROGERS WICKHAM..... Schenectady.

AWARDS

Valedictory

ANDREW WRIGHT LENT.....Highland.

Commencement Orations

WALTER EDWARD BEADLE.....Cooperstown.
CORNELIUS LANSING HAYS.....Albany.
JOHN ALOYSIUS MAHAR.....Rensselaer.
CARL ESSYLSTYNE MCCOMBS.....Frankfort.
ELBERT THEODORE RULISON, JR.....Schenectady.
GEORGE EARL SMITH.....Schenectady.

Engineering Theses

LELAND WESLEY IRISH.....Caldwell.
WINSLOW BARNES WATSON.....Plattsburgh.
HARRY ROGERS WICKHAM.....Schenectady.

Special Honors

In Latin.....ANDREW W. LENT.
In English.....ARCHIBALD H. RUTLEDGE.
In Mathematics.....CORNELIUS L. HAYS. / ANDREW W. LENT.
In Biology.....ELBERT T. RULISON, JR.

Warner Prize

For Seniors

WALTER EDWARD BEADLE.

Blatchford Oratorical Medals

For Seniors

1st. ELBERT THEODORE RULISON, JR.
2nd. CORNELIUS LANSING HAYS.

Ingham Prize

For Seniors

WALTER EDWARD BEADLE.

Allen Essay Prizes

For Seniors

1st. EDWARD D. GREENMAN.
2nd. ARCHIBALD H. RUTLEDGE.
3d. STEPHEN CALKIN FIERO.

Daggett Prize

ELBERT THEODORE RULISON, JR.

Holleran Prize

To the Senior Engineer of Highest Standing

LELAND WESLEY IRISH.

Junior Oratorical Prizes

1st. ERNEST JUDSON ELLENWOOD.
2nd. LOUIS CHRISLER HART.

Sophomore Oratorical Prizes

1st. BYRON WILLIAM REED.
2nd. GEORGE FRANCIS HALL.

Allison-Foote Prizes

Won by the Adelphic Society
and
CORNELIUS LANSING HAYS.
Class of 1904.

R. C. Alexander Prize Scholarship

HARRY COOK.
Class of 1906.

John K. Porter Memorial Scholarships

Thaddeus Guilford Cowell.
Cornelius Lansing Hays.
Andrew Wright Lent.

Gilbert M. Speir Memorial Scholarship

Stephen Calkin Fiero.

The Rankine Prize for Extemporaneous Speaking

Divided between Cornelius Lansing Hays
and
Morris Thomas Raymond.

Phi Beta Kappa

From the Senior Class

Walter Edward Beadle.
Carl Essylstyne McCombs.

Sigma Xi

From the Senior Class

Leland Wesley Irish.
Andrew Wright Lent.
Elbert Theodore Rulison, Jr.

SCHOOL OF ENGINEERING

UNION COLLEGE

SCHENECTADY, N. Y.

FACULTY

ANDREW V. V. RAYMOND, D. D., LL. D.
President

OLIN H. LANDRETH, A. M., C. E.
Professor of Civil Engineering

CHARLES P. STEINMETZ, A. M., PH. D.
Professor of Electrical Engineering

BENJAMIN H. RIPTON, PH. D., LL. D.,
Dean and Professor of History and Sociology

WILLIAM WELLS, PH. D., LL. D.
Professor Emeritus of Modern Languages and Literature, and Lecturer on Current History

THOMAS WRIGHT, A. M., PH. D.
Professor of Mathematics

FRANK S. HOFFMAN, A. M., PH. D.
Professor of Mental and Moral Philosophy

JAMES H. STOLLER, A. M., PH. D.
Professor of Biology and Geology

EDWARD EVERETT HALE, JR., PH. D.
Professor of English

HOWARD OPDYKE, A. B.
Professor of Physics

JOHN LEWIS MARCH, A. M., PH. D.
Adjunct Professor of Modern Languages

FRANK COE BARNES, A. M., PH. D.
Adjunct Professor of Modern Languages

EDWARD ELLERY, A. M., PH. D.
Assistant Professor of Chemistry

FRANK B. WILLIAMS, C. E., M. S., PH. D.
Assistant Professor of Engineering

FREDERICK EDWARDS, C. E.
Assistant Professor of Surveying and Draughting

R. NEIL WILLIAMS, E. E.
Assistant Professor of Electrical Engineering

ELMER E. F. CREIGHTON, B. S., E. E.
Assistant Professor of Electrical Engineering

HAMILTON W. MABIE, LL. D.
Lecturer on English Literature

HERBERT L. TOWNE, A. B., M. D.
Instructor in Physical Culture

C. F. F. GARIS, PH. B.
Instructor in Mathematics

GORDON E. VAN LOON, A. B.
Instructor in Modern Languages

DANIEL A. YOUNG, B. S. in C. E.
Instructor in Surveying and Draughting

HAROLD W. MANSFIELD, B. S. in M. E.
Instructor in Mechanical Engineering

ROBERT B. CUNNINGHAM, A. B.
Instructor in Mathematics

INTRODUCTORY

The charter of Union University brings together under one corporate name and administration Union College, located at Schenectady, N. Y., and the Law School, the Medical College, the Dudley Observatory and the College of Pharmacy, all located at Albany, N. Y.

The Engineering School forms a part of Union College. Its connection with the regular college courses and with the other members of the university group is considered an advantage, as it has a broadening influence and furnishes opportunities for general culture not usually available in a purely technical school.

HISTORICAL

When Union College was chartered, in February, 1795, the only American colleges west of the Hudson River were William and Mary, Princeton, Hampden-Sidney, Rutgers and Dickenson. These, as well as the New England colleges, were all denominational; Union was the first strictly non-sectarian American college, and its name was inspired in part by this novel characteristic. The first full professorship in natural science in an American college was founded at Union, and it is a matter of special scientific interest that Prof. F. R. Hassler was called from this chair in 1811 to establish the U. S. Coast Survey.

The engineering school of Union College is one of the oldest technical schools of the country. Founded in 1845 with Prof. William M. Gillespie at its head, it at once took high rank, and for many years was one of the few engineering schools in America. From the first it appears to have been the evident policy of the school to adapt the thorough training of L'École des Ponts et Chaussées, of Paris, France, where Prof. Gillespie had finished his technical education, to the demands of professional practice in a vigorous new country, where resources and opportunities were abundant, and where capital and professional precedent were wanting. From the characteristic tendencies impressed on the school at its foundation it has never departed, although it has endeavored to keep pace with the development in American tech-

nical education and with the increased demands on professional training. For many years Civil Engineering only was taught; then, as the principles of modern sanitary science came to be better understood and the possibilities of their further development and their utilization as life-saving agencies were discerned, a course in Sanitary Engineering was established; and more recently a course in Electrical Engineering, just now being extended, was added.

During its whole history the school of engineering at Union has stood for broad, fundamental training rather than for narrow specialization, and during recent years, since its advanced entrance requirements have made room in the course, increased time and attention have been given to culture studies and to a larger proportion of academic training.

DESCRIPTIVE

Local Advantages. Schenectady is a peculiarly favorable location for an engineering school. The city is on the Mohawk River, and is intersected by several steam railroads, a number of interurban electric trolley lines and the Erie Canal, furnishing many bridges and other engineering works. At Schenectady are also located the works of the General Electric Company and of the American Locomotive Company, each an extensive and leading plant in its respective line. Among other interesting engineering features may be mentioned the city grade-crossings improvement now just inaugurated at a cost of a million dollars, and the city waterworks, which contain in their outfit a system of ground-water wells and a recently installed set of electrically-driven multiple-stage centrifugal pumps, of twenty million gallons daily capacity. The neighboring cities of Albany, Troy and Cohoes, as well as the surrounding territory, offer numerous examples of good engineering and many features of value as aids in engineering training. Among these may be mentioned the Scientific Departments of the State Government at Albany, including the headquarters of the State Engineer's Department and of the new Barge Canal; the State Library; the Albany City Water Filtration Plant; at Troy the Burden Iron Works; the Steel Plant; the

Gurley Engineering Instrument Manufactory; at Watervliet the United States Arsenal and Gun Factory; the Water Power Developments and Electric Power Transmission Plants at Mechanicville and Spier Falls; the Hydraulic Cement Works at Glens Falls and at Howe's Cave; and the Modern Sewage Disposal System at Saratoga Springs. It is expected that the proposed new barge canal will pass the Cohoes Falls by a flight of locks and will pass Schenectady by a system of locks and dams in the Mohawk River, calling for extensive and interesting engineering operations. All these sources of aid are utilized in the work of the school.

Alternate Courses of Study. Three courses in engineering are offered, each extending through four years: (1) A course in general engineering, which is intended to give the basis of a broad engineering education, including the fundamental principles underlying all special branches of the profession; (2) A course in sanitary engineering which differs from the general engineering course by substituting special work in sanitary subjects for some of the general engineering studies; and (3) a course in electrical engineering, in which the last two years are devoted to essentially mechanical and electrical engineering subjects.

These three courses are identical during the first two years, the sanitary course differing slightly from the general during the last two years, while the electrical course in its last two years differs widely from the other courses.

The degree of Bachelor of Engineering (B. E.) is given for the successful completion of any one of these courses.

The degree of Electrical Engineer (E. E.) is given upon the completion of a one year's graduate course in Electrical Engineering. See page 155.

General Education and Technical Training. In the training of a young man for his professional work two distinct methods are open. One is to separate his professional work from his general educational training and to complete the former before the latter is commenced. This is the plan followed in the professional schools of theology, law and medicine. The other plan is, after the student has reached a certain point in his studies, to have

him carry forward at the same time his general education and his technical training. This plan is the one now generally followed in engineering schools, as it has been found by engineering educators and professional engineers to yield better results in practice than were obtained by the former plan. The point selected at which the technical training shall commence is the beginning of the college course, the four years' time of which is divided between general studies and technical studies. In the Union College engineering courses the time allotted to the two divisions is about equal, though the two are carried on simultaneously, the general training receiving, however, more time in the early part of the course and less in the latter part.

REQUIREMENTS FOR ADMISSION TO THE ENGINEERING SCHOOL

COMMON TO ALL ENGINEERING COURSES

General Conditions for Admission. The general conditions governing admission to the Engineering School are stated in detail on page 64.

Requirements for Examination. Candidates for admission to the Freshman class in any of the Engineering courses are required to pass satisfactory examinations in, or present approved certificates covering the following subjects:

English Literature, Arithmetic, Algebra, Plane and Solid Geometry, Plane Trigonometry, Physics, German or French, History of the United States, Modern Geography, and Physiology, as given in detail on pages 65-71.

EXPENSES, TERMS AND VACATIONS

For information regarding expenses, and terms and vacations, see pages 108, 109 and pages 7, 8, 9.

STUDIES OF THE THREE COURSES

OUTLINE DESCRIPTION

The following is an outline of those studies which in general are common to the three engineering courses. The studies which are peculiar to each are outlined under the separate departments.

Following the distinction between the two kinds of training above mentioned, the studies here outlined are arranged under the two heads of General Studies and Technical Studies.

GENERAL STUDIES

Mathematics. To the engineer the subject of mathematics is valuable not only for its disciplinary training, but also for its practical applications and use. Both these features receive due consideration in the teaching of the subjects under this head.

The studies of this department include algebra (completed), spherical trigonometry, analytical geometry, descriptive geometry, differential and integral calculus. See also pages 86-88.

Analytical Mechanics—The subjects taught under this head are statics, dynamics, hydro-statics, hydro-dynamics, pneumatics. These studies form the foundation for the technical studies of applied mechanics, strength of materials and stresses in framed structures, all of which are fundamental to one of the chief divisions of an engineer's duties, namely that of designing.

Physics—The instruction in physics comprises a series of lectures on experimental physics, followed later by classroom and laboratory work. Physical laboratory work is required of all engineering students. See also pages 88-90.

Chemistry—General chemistry is taught by lectures, recitations and laboratory work during the Freshman and Sophomore years and laboratory work in qualitative analysis is continued through the first term of the Junior year. Sanitary engineering students

in addition to the above take chemical laboratory work during the first and second terms of the Senior year. See also pages 90-92.

Astronomy. The instruction in astronomy includes physical astronomy, spherical astronomy and the theory of astronomical instruments. These studies are preparatory to the work in astronomical surveying and geodesy given in the general engineering course. In the electrical engineering course the work is confined to descriptive astronomy.

Biology. Physiology is a required study in each of the three engineering courses. Structural botany is given in the general and sanitary courses, and bacteriology is given in the sanitary course. Structural botany includes the microscopic study of the vegetable cell, the tissues and the tissue-system of the higher plants, with special reference to the use of woods in the constructive arts. In bacteriology some of the common bacteria of water, air and soil are studied according to the methods of modern bacteriological work. The accompanying lectures treat of bacteria in regard to their place and role in nature and their relations to sanitary science. See also pages 92-95.

Geology (not required in the electrical engineering course). This work comprises a course in economic geology, which includes the general principles of geology and a discussion of the occurrence and distribution of minerals and mineral materials for construction in the United States. See also pages 92-95.

English. The instruction in English aims at a general acquaintance with English literature and a correct, clear and forcible use of the language. Rhetoric is studied throughout the Freshman year. In the first term a summary review of diction is given. In the second and third terms more attention is given to the development of thought by work upon kinds of composition and the paragraph. In the Sophomore year English literature as represented by the work of the essayists and by Shakespeare is studied. In the Senior year one of the required essays of each term will be upon a technical subject prepared under the direction of the pro-

fessor of Civil Engineering, the object being to give the engineering student practice in the preparation of clear, concise and systematic reports on engineering subjects. See also pages 80-82.

Modern Languages. All engineering students at the time of entrance must have had two years of either French or German. After entering they are required to pursue French and German each for one year. This will be advanced work for the language offered at entrance, and elementary work in the alternate language not offered. Some work in scientific French and scientific German is done during the latter part of the course. See also pages 75-79.

Physiology and Physical Training. See pages 95, 96.

TECHNICAL STUDIES

The following technical subjects are included in each of the three engineering courses:

Drawing and Descriptive Geometry. The instruction in this work extends through the entire course. In the first term of the Freshman year the student is instructed in freehand drawing and in freehand lettering. In the second term he is instructed in the use of drawing instruments, in orthographic projections and in construction of geometrical problems and instrumental lettering. In the third term Freshman and first term Sophomore he is given practice in plotting surveys made in the field. Further instruction in topographical drawing follows in the first term of the Sophomore year. Descriptive geometry is begun in the second term Sophomore and, in addition to instruction in the theory, some of the most common applications in practice are taught by the use of practical problems. Schroeder's models and the Olivier models, as well as the models of intersections of the Paris Polytechnic School, are freely used. In the third term Sophomore instruction is given in shades, shadows and perspective and in the theories of oblique projections.

Mensuration and Surveying. This work is begun in the second term of the Freshman year by the study of pure and applied mensuration, together with the fundamental principles of error, precision and computations, illustrated by practice. In the third term the theory of surveying instruments and operations is taken up and illustrated by field practice with the chain, tape, compass, transit, level and rod. In the first term Sophomore topographical surveying is commenced and instruction and practice are given in the use of the various methods and instruments.

As a preliminary to instruction in each branch of surveying a thorough study of the instruments employed is made, treating their geometrical, optical and mechanical relations; their adjustments and use; and the determination of their instrumental constants, errors and limits of precision. The classes are divided into small sections and directed by the instructors. Office computations, plotting and mapping are made adjuncts of the field surveys.

Applied Mechanics and Materials. Applied mechanics is commenced in the first term of the Junior year, and comprises the extension of analytical mechanics and the development of the methods of graphical analysis with their applications to engineering problems, operations and constructions, particularly the treatment of stresses, strains, deflections and deformations in elastic materials and structures due to extraneous forces.

In conjunction with this work is given the study of the production, preparation, strength and physical properties of the various engineering materials, including timber, stones, cement and lime mortar, cast iron, wrought iron and structural steel. Practice in the engineering laboratory is an important adjunct to this study.

This entire division, properly correlated, becomes the foundation of all rational engineering design and construction.

Engineering Law and Procedure. During the first and second terms of the Freshman year and the third term of the Senior year a series of lectures is given on topics pertaining to the training and the qualifications of engineers, and to engineering practice. In the third term of the Senior year a course is given in the study of the elements of the law and principles of procedure in contracts,

agency, corporations, commercial and financial transactions and industrial accounting and of the law relating to land boundaries and titles, water courses and surveys.

Voluntary Studies. Any of the studies of the classical course or of the scientific course of the college may be taken by engineering students without extra charge.

Final Examinations. During the Senior year a series of final examinations will be held covering the more important subjects of the entire course. The list of subjects in which examinations are to be given during any term will be determined by the faculty.

Theses. Each candidate for graduation is required to present on or before the first Wednesday in June of his graduation year a satisfactory thesis on a subject that has been approved by the professors of Civil Engineering or of Electrical Engineering. This thesis must be original in its character and may be either a design for some engineering structure or plant, process or operation, or an independent investigation of some principle, problem or matter of engineering importance. Reviews or copies of existing structures, plants or processes, unless of special educational value or involving original investigation, will not be approved as subjects. This thesis is to be in a form prescribed at the time of approval of the subject, and is to be bound for deposit in the library of the engineering school, and must be presented in this shape on or before the stipulated date. The subjects, with outlines of the proposed treatment, must be submitted for approval not later than January 1st of the graduation year, and the work on the theses must be presented for inspection and criticism of the professor in charge of the department at intervals during progress.

Library

The students have the use of the College and Society Libraries. The former contains the Engineering and Scientific Library of the late Professor Gillespie and other valuable technical collections. See page 96.

GENERAL ENGINEERING DEPARTMENT

In addition to the studies common to all engineering courses previously described, the following subjects are included in the general engineering course:

Drawing and Descriptive Geometry (continued). In the Junior year work in drawing includes machine drawing and the solution of problems in graphical analysis. In the Senior year the subject includes the work in engineering design and construction of the last two terms, and comprises a large amount of structural drawing in the development of the designs of engineering structures. A course in stereotomy and stone cutting is given in the first term Senior, with drawings from the stereotomy models of the Paris Polytechnic School. Practice in blue printing is made a part of these courses.

Surveying (continued). Railroad surveying is treated in the third term of the Junior year, and the students are given exercises in the proper field operations on railroad surveys, office and field location and staking out work for construction. The subject of railroad construction and equipment is not treated until the first term of the Senior year.

Geodesy and Astronomical Surveying. This course is given in the third term of the Senior year, and comprises a discussion of the figure of the earth, triangulation systems, base lines, geodetic observations, reductions and adjustments, determination of latitude, time and azimuth, transformation of co-ordinates and map projections.

When feasible about three weeks of uninterrupted field and office practice will be devoted to this subject in the Junior or in the Senior year.

Engineering Design. The course in applied mechanics and materials prepares the student to undertake the study of engineering design proper. which is pursued throughout the Senior year; an

important feature of this course is the work in bridges, railroads and water-power developments, architectural engineering, etc. The exercises in this line of work are, as far as possible, chosen from professional practice, and the student is expected to carry out, from assigned data and conditions, the preliminary study, determinations of stresses, types, dimensions and details, and to turn in the results in the form of working drawings, diagrams and memoirs. The department possesses a large collection of drawings and photographs of representative engineering structures from which students can form correct ideas of modern practice in the designing of details and in the methods followed on works of this class.

Water. The subject of water is considered from several standpoints. In the first term Junior is given a laboratory course in chemistry, followed by a course in water analysis. In the third term Junior is given a course in hydraulics, followed in the Senior year by a fuller development of the subject as applied to rainfall, run-off and storage of water, in relation both to water power and to potable water supplies. This course is accompanied by a study of the sanitary aspects of the subject of water supply and its preservation from contamination. An outline study is also made of pumping engines.

Highways. The study of highways in the first term of the Junior year comprises a consideration of the highway as an element in the transportation system of the State, the principles of its economic location and proper construction, a study of the various modes of construction and the materials employed, its proper maintenance and systems of highway laws and administration.

As a preliminary to the study of highway location as well as of railroad and route surveying, some consideration is given to the principles and fundamental laws of topographical types and forms and their relation to the various modes of earth sculpture.

Streets and Pavements. A study of the methods of laying out and grading streets and pavements and of the various street

accessories, paving methods and materials and their treatment, with special reference to their economic and sanitary aspects, is given during the second term of the Junior year.

Motors and Motive Power. Following the work in thermodynamics and hydraulics of the third term of the Junior year an outline course in motors and motive power is given in the first and second terms of the Senior year, comprising a study of the sources of demand and supply of power, steam-boilers, steam-engines, steam turbines, water-wheels and turbines, gas-engines, electric motors and transmission of power by shafting, belting, rope-drives, compressed air and electricity.

Instruments and Apparatus

The department is supplied with field instruments of the best description, comprising a large theodolite, suitable for refined geodetic operations, transits, surveyors' compasses, prismatic compasses, Burnier's compass, solar compass, Y levels, the levels of Troughton, Egault, Lenoir and Burnier; plane tables, sextant, octant, mountain barometers, aneroid barometer and a marine chronometer.

The extensive private collection of models and instruments belonging to the late Professor Gillespie has been purchased for the Engineering School.

The collection of models in Descriptive Geometry and Stereotomy is very complete. The following are some of the most important:

The Olivier Collection. This consists of about fifty models, representing the most important and complicated ruled surfaces of Descriptive Geometry, particularly warped or twisted surfaces. Their directrices are represented by brass bars, straight or curved, to which are attached silk threads representing the elements or successive positions of the generatrices of the surfaces. Each of these threads has a weight suspended by it, so as always to make it a straight line. These weights are contained in boxes sustaining the directrices and their standards. The bars are movable in

various directions, carrying with them the threads, still stretched straight by the weights in every position they may take; so that the forms and natures of the surface which they constitute are continually changing, while they always remain ruled surfaces. In this way a plane is transformed into a paraboloid, a cylinder into a hyperboloid, etc.

These models were invented by the late Theodore Olivier while Professor of Descriptive Geometry at the Conservatoire des Arts et Métiers, in Paris. One set of them is now deposited there, and a second is in the Conservatory of Madrid. Copies of some of them are to be found in most of the polytechnic schools of Germany. The Union College set is the original collection of the inventor, having been made in part by his own hands, and, after his death, in 1853, retained by his widow till bought of her by Professor Gillespie, in 1855. It is more complete than that in the Paris Conservatoire. It may be worth noticing that the silver plates on the boxes, reading *"Inventé par Théodore Olivier,"* etc., were added by Madame Olivier, at her own expense, after the purchase, as a tribute to the memory of her husband, her own words being, *"Je tenais à ce que chaque instrument portât le nom du savant dont la réputation passera à la postérité."*

Professor Bardin's (Paris) plaster models (seventy) of the INTERSECTIONS of prisms, pyramids, cylinders, cones, etc.

Schroeder's (Darmstadt) models (twenty) of elementary DESCRIPTIVE GEOMETRY. The planes of projection are in wood, and the lines and surfaces in metal; models illustrating Shades and Shadows.

Stone Cutting Models (twenty) in plaster, selected from those of L'École Polytechnique of Paris.

Professor Bardin's models (ten) in plaster, of OBLIQUE ARCHES.

Groined and cloistered arch models (ten) in wood and plaster.

Models of structures in stone, consisting of bridges, culverts, etc.

Winding-stair models in wood and plaster. Full sized models of voussoirs and skew-backs of an oblique arch.

Models in Topography. French and German plaster models, giving all the different forms of ground, accompanied by topographical drawings, showing how to represent these forms by

contour lines; hatchings and shades from vertical and oblique light; models and maps in colored topography; a large model of Mount Cenis Pass, showing the wagon road and contour lines.

Architectural Models. Models of the five orders of Architecture from L'Ecole des Beaux Arts, Paris; portals; stairs; roofs; walls; buttresses; domes, etc.

Engineering Models. Schroeder's models of joints, brick bonds, etc.; spur wheels; bevel wheels; cranes; pile drivers; various forms of water-wheels; pumps; cylinders; valves; eccentrics, etc.; steam engines.

Casts of St. Venant's models showing the changes of form in bodies subjected to flexure. Full sized model of the liquid vein measured by Poncelet and Lesbros.

Models of bridges of various systems, comprising truss, suspension, tubular and arch bridges; Doyne's Dynamometer Bridge Models showing, by means of dynamometer, strains at different points; models of roof trusses, arranged for using the dynamometer to show the different stresses.

Models of fortifications, illustrating Vauban's system; shot, shell, etc.

Models of culverts, piers, abutments, culvert heads, wing walls, rail sections, etc.

Maps, Drawings, Etc. This collection embraces a large number of maps, plates, profiles, topographical drawings and spherical projections; about fifty thousand engravings, lithographs, photographs and detail drawings of engineering and architectural structures; working drawings of machines, bridges, buildings, etc.

Physical Apparatus—To illustrate the lectures in Physics, the college has an extensive collection of apparatus. This has been secured largely from foreign makers and includes special pieces of apparatus constructed under the direction of the late Prof. Foster, besides sets of apparatus of standard patterns by Koenig, Duboscq, Ruhmkorff, and others.

In Mineralogy. The Wheatley collection contains nearly 4,000 specimens of minerals, the result of the labors of Charles M. Wheatley. All of these have been labeled according to the nomenclature and order adopted by Dana. They are, without exception, open at all times to the students. They furnish an admirable means of practical illustration in Mineralogy. Among the rare and valuable specimens are those of Anglesite, Cerusite, Mimetite and Calcuprite, which in American specimens are equaled only by those in the British Museum. There are many fine specimens representing the noble metals from all parts of the world. There are few known species of minerals of which the collection does not contain some specimens.

In addition to this there is a large series of unlabeled specimens for crystallographic and blow-pipe examination.

In Metallurgy. The College possesses a suite of ores of the useful metals, comprising over 1,000 specimens. These have been arranged to illustrate their mode of occurrence and geographical distribution. In addition are the fluxes, fuels, etc., used in obtaining the metals from the ores, together with the slags and metals themselves in various forms. There is a large number of models and drawings of stacks, furnaces, etc.; also suites of specimens of wood, charcoal, mineral coal, peat, etc., for physical inspection; also specimens of most of the useful alloys.

In Chemistry. The chemical laboratory is furnished with tile-top desks and lockers, and all the modern apparatus necessary for work in general chemistry and qualitative and quantitative analysis. Ample hoods occupy one side of the laboratory, where the student may work with the disagreeable and poisonous gases. In the private laboratory of the professor of chemistry provision is made for any students who may desire to pursue advanced courses, either in volumetric analysis, water and milk analysis, organic chemistry, or any special work in connection with courses of other departments.

A large number of specimens of the materials used in the manufacture of the mineral and of some of the organic acids; the crude products themselves and the materials used in the manu-

facture of the alkalis, soaps, matches, black lead, candles, petroleum products; linseed, olive, castor, cottonseed and other oils; paper, porcelain, glass, fire and building brick, mortar and cements, beet and cane sugars, white lead and other paints, etc., etc., form a part of the permanent collections of the department.

SANITARY ENGINEERING DEPARTMENT

General Considerations. The extensive development of sanitary biology during recent years and the establishment on a firm, scientific basis of the germ-theory of disease have laid a secure foundation for the important specialty of sanitary engineering. Already the practical application of the principles in many lines of public utility, as well as in medicine and surgery, has resulted in a very marked decrease in the annual death rate. The most fruitful line of application of this recent and useful knowledge lies in the intelligent design, construction and operation of municipal public works and of systems of water supply, sewerage and drainage, heating and ventilation of private residences, schools, hotels, hospitals and other public institutions and buildings.

General Scheme of the Course. The course in sanitary engineering differs from the general engineering course by omitting the astronomical surveying, geodesy and railroad construction, and substituting therefor sanitary biology, heating and ventilation, house drainage and plumbing, sewage disposal, sanitary codes and laws, and an increase in the amount of chemistry and chemical laboratory work.

Sanitary Conditions of Buildings. In the first and third term Senior, respectively, are given courses in heating and ventilation and in house drainage and plumbing. The latter course will give special attention to the matter of water supply and of the removal of wastes from buildings in all situations, from the isolated country house to that in a thoroughly drained city.

Sewerage and Drainage. The study of the systems of sewerage and sewage disposal extends through the last two terms of the Senior year. The fundamental sanitary and constructive principles will be developed and a comparative study of the various systems as well as of the details of construction and maintenance receive careful attention. A course of lectures in the third term Senior presents the principles upon which the laws touching the subject of the public health are based and the outlying principles which should govern the preparation of sanitary codes and regulations.

For special information regarding the Departments of General and Sanitary Engineering address

OLIN H. LANDRETH,
Professor of Engineering, Schenectady, N. Y.

ELECTRICAL ENGINEERING DEPARTMENT

A course of instruction in Electrical Engineering was introduced in 1895, and in 1902 was reorganized and made into a separate department of the engineering school under the direction of Professor Charles P. Steinmetz, consulting engineer of the General Electric Company.

The course of studies offered by the Department of Electrical Engineering aims at a thorough and broad scientific education of the prospective engineer, rather than the specific training of a specialist. The instruction, therefore, consists of three classes of studies. The general culture studies furnish such training as is now considered essential for every educated man, as languages, literature, history, etc. Such instruction extends over a large part of the first two years, and is then followed by a broad and general technical education, giving the student the fundamental principles and their application to all branches of engineering. Ultimately follows the specific instruction in Electrical Engineering, which, while it enables the student, after graduation, to enter the field of Electrical Engineering practice in the manufacturing or operating company or consulting engineer's office in a subordinate

capacity only, has given him all the necessary requirements to gather in a few years' practice the knowledge needed for independent work of greater magnitude.

The instruction especially aims at a thorough understanding of the fundamental principles rather than a memorizing of numerous facts—that is, aims at quality, and not quantity—and as far as possible in all engineering instruction the subject is brought before the students in three different ways: by a theoretical lecture course with recitations, practical instruction in the electrical laboratory paralleling the lecture course, and, following after this, the application of the knowledge gained in lecture courses and laboratory to calculation and design in the drafting room. Throughout the technical course, by work in the laboratory, some familiarity with the apparatus is given to the students before the technical side is taken up in the lecture course, so that when approaching the theoretical studies of electrical phenomena or apparatus the student is already able to appreciate the practical value and importance of the subject with which the theoretical investigations deal.

Through the active interest which the General Electric Company takes in technical education, an arrangement has been effected between the College authorities and the officials of the company by which the students in the Junior and Senior classes are admitted to the company's works at regular scheduled times, under the direction of their instructor, with the privilege and opportunity of studying and inspecting the plant and operations and of being regularly instructed therein. The work has been systematically arranged, and is given simultaneously with the corresponding class and laboratory work, to which it forms an important and valuable adjunct.

The active interest taken by the prominent engineers of the General Electric Company has made it possible to offer to the Junior and Senior classes a systematic lecture course on the different branches of Electrical Engineering, in which the lecture on each topic is delivered by the specialist who is the highest authority in this branch of Electrical Engineering.

List of Studies—Outline Description

The following list of studies comprises only those subjects of the electrical engineering course which are not required in the other courses, and have therefore not yet been described in detail. All the culture studies and most of the general engineering and scientific studies are pursued in common with the students of other engineering branches. Beginning with the Junior year, however, the courses diverge in many respects. The electrical engineers take up a number of mechanical engineering subjects and continue them throughout the Junior and first part of the Senior year. In fact, during the Junior year the mechanical engineering work may be considered as constituting the major subject, though a considerable amount of time is also devoted to electrical engineering.

The mechanical engineering subjects not previously described are:

Hydraulics and Hydraulic Design.
Hydraulic Turbine.
Theory of the Steam Engine.
Steam Engine Design.
Thermodynamics, Gas Engine and Steam Turbine.

Other general subjects given only to electrical engineering students are:

Elements of Civil Engineering. The work and methods of the civil engineer. This course is given to broaden the ideas of the student, thus enabling the electrical engineer to value properly the labors of his colleague in this allied department of the profession.

Engineering Mathematics. One lecture a week is given throughout the Junior and Senior years on the special branches of mathematics most employed in engineering work. The lack of mathematics as a ready working tool of the engineer is continually felt, and this course has been introduced with a view to satisfying this want and turning out men who have been thoroughly trained in this important particular and are equipped with a practical,

working knowledge of the subject. This course is given by Prof. Steinmetz, and in 1903-1904 covered the infinite series, its derivation and meaning; the trigonometric series; determination of maxima and minima; the fundamental differential equation of electrical engineering and its integral; empirical curves and their investigation, as the parabolic, exponential and logarithmic function.

The electrical engineering studies include the following:

Sophomore Electrical Laboratory. The profession of electrical engineering requires men who, besides possessing the broad fundamental knowledge which must form the basis of every engineering work, are thoroughly familiar with the operation, characteristics, underlying principles, design and calculation of the various machines and appliances used in electrical work. The multiplicity of the applications of electrical energy at present is such that in order to cover the ground in the short time afforded by a four years' course special effort must be made to present the matter in such form and manner as to secure to the student the greatest economy of time and energy.

To this end the student is made acquainted in his Sophomore year with the operation and general behavior of electrical machinery, so that when in the Junior year the exact theoretical and laboratory investigation of electrical apparatus is undertaken he may already have some knowledge of the nature, general features, purpose, etc., of his studies.

This preliminary work, which has been found to increase greatly the efficiency of the work done in the Junior year, consists in the handling and running of motors and generators, both direct and alternating current; the use of transformers; the study of arc lights of various constructions and systems and in general practice in the use of meters and measuring instruments. The practical construction of the machinery is also considered and at regular intervals trips are made to the foundry, pattern shops, erecting shops and machine shops of the General Electric Company and of the American Locomotive Works.

Direct Current Circuits and Apparatus. After completing the electrical laboratory work of the Sophomore year students in electrical engineering devote a considerable part of the Junior year to the study of the fundamental principles of the subject. Direct current phenomena are studied first for pedagogical reasons, as this part of the subject is somewhat simpler and is readily brought within the grasp of the average student. This work includes the theory and practice of direct current generators and motors and auxiliary apparatus, taking into account also the principles of design.

Direct Current Laboratory. The work under this head is parallel with the foregoing, and includes all standard tests of direct current machines, and is supplemented by numerous experiments arranged with due regard to their pedagogical interest and scientific value. The machines with which the student has become more or less familiar during his Sophomore year are now examined in detail and careful records made of efficiency, regulation, internal characteristics, commutation under varying loads, etc.

Direct Current Design. When the foregoing courses have been finished each student is directed to design a specified machine and is required to do this work in class and without other aid than that given by the instructor. Complete calculations, with curves, where necessary, and full working drawings of the machine designed, are required, and credit is given for accuracy, originality and neatness.

Alternating Current Circuits and Apparatus. The importance of alternating currents in modern electrical engineering and the complex nature of their phenomena make it essential that a large amount of time be spent in the study of alternating current circuits and apparatus. This work is taken up in the second term of Junior year immediately after the completion of direct current theory and in conjunction with direct current design and is continued throughout the Junior and during a part of the Senior year. The work included under this head covers the more ele-

mentary part of the subject and is made practical by the assignment of a large number of problems to be worked out by the student. It is carried on at the same time with the following course.

Alternating Current Laboratory. The work done here in the Junior year consists of an extensive series of experiments corroborating and explaining the theories of the lecture room. The exercises consist in investigation of voltage and current conditions on a variety of combinations of resistance, inductance and capacity in series and in multiple, the exploring of field flux and wave shapes of alternators, and the effect of inductance and capacity on wave shape. Upon entering the Senior year the student is thus equipped with the broad foundation in the underlying principles of electrical engineering, which is absolutely essential to a comprehensive study of the more intricate and special departments of the subject.

Modern Theory of Electrical Engineering. Here the subject of alternating current phenomena is continued throughout the Senior year. The method of treatment developed by Professor Charles P. Steinmetz is used entirely, and is applied to the different apparatus, as transformers, induction motors, phase and frequency converters and other induction apparatus; alternators, synchronous motors, rotary converters and other synchronous apparatus, etc., which are thoroughly discussed with reference to theory, practical design and operation under varying conditions.

Alternating Current Laboratory. In this course, which is parallel with the foregoing, complete tests are made on the apparatus studied, and the characteristics of the various machines are determined. The laboratory work deals with the transformer: ratio, impedance and coreloss characteristic, regulation and heat runs, the synchronous motor and generator: amplitude and phase displacement of the various phases of multiphase machines, no load and load saturation, phase characteristics, pulsation, regulation and compounding curves, starting test, etc., the induction motor: determination and plotting of curves for power

factor, speed, slip, torque, efficiency, apparent efficiency as function of loan and as function of speed, starting tests on motors with squirrel cage armatures and compensator, also on machines with variable rotor resistance, impedance and coreless curves and maximum output determination, the single phase induction motor, etc.

Alternating Current Machine Design. This subject is taken up in the Senior year and problems are assigned to each student. such as design of transformers, induction motors, etc.

The foregoing courses cover the general theory of electrical phenomena and machinery. The application of this knowledge to the various fields of electrical engineering work is taken up in the following courses.

Electric Lighting. This covers methods of using electricity in the production of light, systems of distribution, their comparative economy and efficiency, central station layout and equipment, switchboard design, electricity meters, lightning protection, standard wiring, indoors and out-of-doors.

Electric Transmissions. The subjects discussed here are long distance transmissions, line construction, systems, grouping of machines, control of phase, methods of compensation, maximum power supplied over line, line efficiency, copper efficiency, distributed capacity, inductance, resistance, leakage and natural period of transmission line, surging, resonance due to higher harmonics, balanced and unbalanced polyphase systems, transformations.

A part of this course, dealing with the more intricate problems, is given by Prof. Steinmetz personally.

Electric Railways. The subject of electric railway engineering is treated in three sections: 1. From the point of view of the consulting engineer who, being retained by the promotors of a proposed railway, investigates the field and territory of the new line, advises as to probable earnings of line, lays out route, prepares plans and specifications and has charge of construction. 2.

From the point of view of the operating engineers who have charge of rolling stock and maintenance of service on the line. This includes a complete discussion of the equipment of modern electric railways, the various systems in vogue, sub-station equipment and in general the operation of electric railways. 3. The problem of the electric railway as it is presented to the designing electrical engineer is discussed. About half of the time devoted to railways is reserved for this section of the work. The questions of predetermination of railway motors from service characteristics, of train resistance and other quantities affecting the operation of electric trains are treated and the various alternating current railway motors which are being developed are discussed. The experimental railroad operated by the General Electric Company in Schenectady is a valuable auxiliary in this course.

Electrochemistry. This course is given every second year to both Juniors and Seniors, under the direction of the Electrochemical Research Laboratory of the General Electric Company. It includes the theory of solutions, osmotic pressure, dissociation, concentrations and an outline of the principles underlying the many electrochemical processes of commerce.

Technical French and German. This course includes reading from current issues of French and German technical papers, with explanation of the technical terms occurring. At the same time such articles are chosen as are in line with the regular studies of the course, and are thus likely to throw light on some parts of the work from the point of view of foreign engineers. In 1903-1904 a number of articles was read describing the experiments being made at Zossen on high speed electric railways.

Lectures by Electrical Engineers. Throughout the Junior and Senior years lectures on technical subjects are delivered before the electrical engineering students by prominent electrical engineers who are specialists in the branch on which they lecture. During the year 1903-1904 the following lectures were given:

Introductory ..... Dr. C. P. Steinmetz
Historical Development ..... W. S. Andrews

D. C. Commutating Machines.....H. F. T. Erben
Calculation and Design of D. C. Commutating Machines
W. F. Dawson
Boosters and Variable Speed Motors.....H. Bickerstaff
Electrical Calculation of A. C. Generators and Syn. Motors
W. J. Foster
Electric Calculation of Induction Motors.....A. E. Averett
Mechanical Design of Gen. and Syn. Motors.....H. G. Reist
Mechanical Design of Induction Motors.....H. G. Reist
General Transformer, Generators, Boosters, Frequency Converters, etc.....Dr. C. P. Steinmetz
Potential Regulators.....E. F. Gehrkens
Constant Current Transformers.....M. O. Troy
Reactors.....J. J. Frank
Converters and Double Current Generators.....L. F. Deming
Syn. Motor, Converter, Ind. Motor, Sphere of Application
Dr. C. P. Steinmetz
Parallel Operation of A. C. Generators and Motors
W. I. Slichter
Phase Control of Long Distance Transmission Lines by Synchronous Motors and Converters, Elementary Calculation
Dr. C. P. Steinmetz
Modern 60,000-Volt Installations.....P. T. Hanscom
Design of High Voltage, Large Power Systems.....T. H. Soren
Elementary Theory of Distributed Capacity, Resistance and Inductance. High Voltage Oscillations and Surges
Dr. C. P. Steinmetz
Theory of Electric Instruments.....C. D. Haskins
Lightning and Lightning Protection, with Experiments
Dr. C. P. Steinmetz
City and Interurban Railways.....W. J. Davis, Jr.
Rapid Transit and Acceleration. High Speed Trunk
A. H. Armstrong
Repulsion Machines.....W. I. Slichter
Vacuum Tube Phenomena, X-Rays, Ultraviolet Light
W. S. Andrews
Storage Battery.....A. H. Armstrong
Electrolysis; General Principles.....Dr. W. R. Whitney

Electrical Equipment of Warships.....MAXWELL DAY
Principles of Polyphase Circuits and Apparatus
DR. C. P. STEINMETZ
Industrial Electrochemistry.....DR. C. A. ERNST
Switchboard Design.....A. S. LOISEAUX
A. C. Armature Winding.....H. G. REIST
Wire Telegraphy, with Demonstration.....JOHN HARDEN

During the year 1904-1905 the following lectures are being given:

Jan. 4. C. P. STEINMETZ, Units.
" 10. H. G. REIST, Armature Winding.
" 17. J. HARDEN, High Temperatures.
" 24. C. P. STEINMETZ, General Transformer, Frequency Converter, etc.
" 31. W. S. MOODY, Transformer Practice.
Feb. 7. M. O. TROY, Constant Current Transformer.
" 14. DR. WHITNEY, Principles of Electrochemistry.
" 21. C. P. STEINMETZ, Science and Engineering.
" 28. J. HARDEN, Electrochemistry in Agriculture.
Mar. 7. A. G. DAVIS, The Engineer and the Patent Law.
" 14. O. JUNGREN, Underlying Principles of the Steam Turbine.
" 21. C. P. STEINMETZ, Prime Movers.
" 28. A. L. ROHRER, Cost of Power.
Apr. 4. W. I. SLICHTER, Some Characteristics of Railway Motors.
" 11. S. T. DODD, The Development of Railway Motors.
" 18. W. B. POTTER, Electric Railways.
" 25. C. P. STEINMETZ, Lightning and Lightning Protection.
May 2. M. O. TROY, Condensers.
" 9. W. S. ANDREWS, Radium.
" 16. C. P. STEINMETZ, Unsolved Problems.

Dates will be announced later for lectures by Elihu Thompson, of Swampscott, C. C. Chesney, of Pittsfield, and C. M. Greene, of Lynn.

Electrical Laboratory Equipment

The equipment of the Electrical Engineering Laboratory has been greatly augmented of late by a large amount of apparatus, a considerable portion being appropriated by the General Electric Company, and the laboratory has been extended to accommodate this apparatus.

The purpose of a college laboratory of Electrical Engineering is two-fold: To familiarize the student with the shape, appearance, relative proportions and construction of modern electrical apparatus, and to instruct him in the handling, assembling, testing and operation of electrical apparatus under normal and abnormal conditions.

Because of the great variety and large size of modern electrical apparatus, the former purpose can be fulfilled very incompletely only, even in the largest and best equipped college laboratories. Through the favorable disposition of the General Electric Company, by giving the Electrical Engineering students of Union College free access to the works and testing rooms, this purpose is admirably fulfilled here, and by frequent and regular inspection trips to the Works and Testing Department of the General Electric Company under the direction of the college instructors, which trips constitute an integral part of the laboratory instruction, the students gain a very intimate knowledge of modern electrical apparatus of all types and sizes, not only when assembled and in operation and test, but also during their construction in the shops.

In equipping the college laboratory special consideration was therefore given to the selection only of such representative types of apparatus as can be handled, operated and tested by the students, and of a size sufficiently large to correspond to modern practice, but not so large as to make the operation under abnormal conditions—that is, under conditions which as a rule are specially instructive—unsafe for the apparatus. Entirely excluded from the laboratory equipment was all such machinery as the students could not be permitted to handle freely.

Three sources of power are provided: A direct connected unit, consisting of a Westinghouse gas engine and a Westinghouse direct current generator; connection with the 500-volt trolley circuit of the Schenectady Railway Company, and connection with

the primary distributing mains of the 2,300-volt alternating current city circuit. In the latter case the voltage is reduced by banks of step-down transformers, so that the students can handle the safe low tension circuits only.

A very large number of various sizes of transformers are provided to give the students practical experience in connecting transformers for different ratios and for transformation between three-phase, quarter-phase, six-phase, etc., systems. The equipment further contains three-phase, quarter-phase and six-phase alternators and synchronous motors, the two characteristic types of induction motors, three and six-phase rotary converters, and numerous smaller induction motors, converters and direct current motors and generators of different types. A constant current arc machine, with different types of arc lamps and a constant alternating current transformer, with series arc lamps, a storage battery, testing tables, switchboards and numerous instruments of the indicating and the integrating type, are also provided for efficient instruction.

Power is distributed from a central switchboard to the various smaller machines in the Department, to the mechanical workshop provided for the students, and to the general lighting circuit of the building, and further extensions of the laboratory are under contemplation.

Graduate Course—One Year

Leading to the Degree of E. E.

To those students who, after graduating from the four-year Electrical Engineering course, desire to increase their knowledge a Graduate Course is offered in which, besides instruction in higher branches of Electrical Engineering, there will be occasion to carry out original investigations under the supervision and with the assistance of specialists prominent in Electrical Engineering practice on subjects closely connected with the most recent advance of Electrical Engineering. In return for the assistance offered to the Graduate students in their research work by prominent specialists the Graduate students will be required

to devote a small part of their time to assisting the regular University instructors in laboratory instruction. This course leads to the degree of Electrical Engineer, and is open to graduates of Union College or of other institutions approved by the Faculty.

Some of the courses offered to the graduate students are:

Advanced Calculus, 1 term, 1 hour.
Differential Equations, 1 term, 1 hour.
Long Distance Transmission, 2 terms, 2 hours.
Design and Control of Electric Power Systems of Very Great Magnitude, 2 terms, 2 hours.
Electric Railway and Traction, continued, 3 terms, 2 hours.
Modern Theory of Electrical Engineering, continued, 3 terms, 2 hours.
Oscillating Currents and High Frequency Phenomena, 2 terms, 1 hour.
Lightning and Lightning Protection, 1 term, 2 hours.
Wave Transmission, with Special Application to Telephony, 1 term, 2 hours.
Scientific Foundations of Electrical Engineering, 2 terms, 2 hours.
Electro-Chemistry, 1 term, 2 hours.
Chemistry of Very High Temperature, 1 term, 2 hours.
Laboratory.
Research Work.

Some of the lectures given by Professor Charles P. Steinmetz for Graduates during the year 1903-1904 were:

1. Review: The Electric, Magnetic and Dielectric Circuit. Resistance, Inductance, Capacity and Wireless Telegraphy.

2. The Law of Electromagnetic Induction; Electric Apparatus and Machines.

3. The Characteristic Curves of Electrical Apparatus, Machines and Circuits, Magnetic Characteristic: Saturation and Excitation Curve. Load Characteristic: Regulation Curve, Field Characteristic, Compounding Curve. Phase Characteristic of Alternating Current Apparatus; Efficiency, No Load and Load Losses.

4. Commutating Machines: Direct Current Generators and Motors.

5. Synchronous Machines: Alternators and Synchronous Motors and Converters.

6. Induction Machines: Induction Motors and Generators, Single Phase and Polyphase Repulsion Motors and Generators.

7. Rectifying Machines: The Arc Machine, Constant Potential and Constant Current Rectification.

8. Transformers and Reactors: Constant Potential and Constant Current.

9. Meters: Indicating, Integrating and Recording.

10. Transient Phenomena: Starting and Building Up of Direct Current Generators; Effect of Field Inductance and Fluctuating Load. Starting of Synchronous Machines.

11. Starting of Transformers, of Inductive Circuits, of Circuits containing Inductance and Capacity, Transmission Lines. Short Circuit Phenomena of Circuits containing Inductance and Capacity. Transmission Lines, Short Circuit Oscillations.

12. Short Circuit Current of Direct and Alternating Current Generators.

13. Hunting or Surging of Synchronous Machines, Motors and Converters. Hunting or Surging of Induction Machines, of Direct Current Motors and Generators.

For special information regarding the Department of Electrical Engineering address

CHARLES P. STEINMETZ,

Professor of Electrical Engineering, Schenectady, N. Y.

CURRICULUM OF THE B. E. COURSE[1], 1904-1905— GENERAL ENGINEERING.

	First Term	Second Term	Third Term
Freshman Year[2]	3 French 3 German 3 Freehand Drawing 4 Algebra 2 Rhetoric 1 Physiology 1 Experimental Physics 1 Experimental Chemistry Lectures	3 French 3 German 3 Analytic Geometry 2 Mensuration 3 Mechanical Drawing 2 Rhetoric 1 Experimental Physics 1 Experimental Chemistry 1 Gymnastics Lectures	3 French 3 German 2 Rhetoric 3 Analytic Geometry 4 Surveying and Plotting 1 Physiology 1 Plane Trigonometry (review) 1 Experimental Physics 1 Experimental Chemistry Summer Vacation Work
Sophomore Year[2]	5 Calculus 4 Mechanics and Physics 3 English Literature 3 Chemistry 1 Hygiene 1 Rhetoric	3 Calculus 6 Mechanics and Physics 2 English Literature 3 Chemistry 3 Descriptive Geometry 1 Electrical Laboratory 1 Rhetoric	6 Physics 3 Calculus 3 Topographical Surveying 3 Descriptive Geometry; Shades and Shadows 3 Chemistry 1 Electrical Laboratory 1 Rhetoric Summer Vacation Work

[1] The figure at the left indicates the number of hours per week devoted to class work in the subject.

[2] Identical in General, Sanitary and Electrical Engineering courses.

CURRICULUM OF THE B. E. COURSE[1], 1904-1905—GENERAL ENGINEERING.

	First Term	Second Term	Third Term
Junior Year[3]	5 Topographical Surveying 4 Applied Mechanics 3 Chemical Laboratory 2 American History 3 Highways 1 Rhetoric	5 Mechanics of Materials and Eng. Laboratory 2 American History 3 Kinematics and Machine Drawing 2 Pavements 1 Natural Perspective 3 Spher. Trigonometry and Astronomy 1 Rhetoric	4 Stresses in Structure and Graph. Analysis 3 Hydraulics 2 Thermodynamics 3 Route Surveying 3 Mathematical Theory of Electricity 2 American History 1 Rhetoric Inspection Trips Summer Vacation Work
Senior Year	2 Motors and Motive Power 4 Engineering Stresses 3 Economics 2 Stereotomy 2 Outlines of Architecture 2 Railroad Construction 2 Economic Geology 1 Rhetoric Inspection Trips	3 Motors and Motive Power 4 Engineering Design and Construction 3 Water Supply Engineering 2 Building Construction 2 Method of Least Squares 3 Sewerage 1 Rhetoric Inspection Trips	5 Engineering Design and Construction 3 Engineering Law and Procedure 4 Geodesy and Field Astronomy 4 Electives[4] Thesis

[1] The figure at the left indicates the number of hours per week devoted to class work in the subject.

[3] Identical in General and Sanitary Engineering courses.

[4] For list of electives, see page 103.

CURRICULUM OF THE B. E. COURSE[1], 1904-1905— SANITARY ENGINEERING.

[The Freshman, Sophomore and Junior Years of this course are identical with those years in the General Engineering Course.]

SENIOR YEAR.

First Term	Second Term	Third Term
2 Motors and Motive Power	3 Motors and Motive Power	5 Engineering Design and Construction
4 Engineering Stresses	4 Engineering Design and Construction	2 Sewage Disposal
3 Economics	3 Water Supply Engineering	3 Engineering Law and Procedure
3 Heating and Ventilation	2 Chemical Laboratory	3 Bacteriology
3 Chemical Laboratory	3 Sewerage	1 Sanitary Codes and Laws
2 Economic Geology	2 Structural Botany	1 House Draining and Plumbing
1 Rhetoric	1 Rhetoric	2 Electives[2]
Inspection Trips	Inspection Trips	Thesis

[1] The figure at the left indicates the number of hours per week devoted to class work in the subject.

[2] For list of electives, see page 103.

CURRICULUM OF THE B. E. COURSE,[1]—ELECTRICAL ENGINEERING.

For the general plan of the course, see page 144. In 1904-5 the course was as follows:

Freshman and Sophomore Years as in General Course, page 158.

JUNIOR YEAR.

First Term	Second Term	Third Term
1 Mathematics	1 Mathematics	1 Mathematics
4 Applied Mechanics	1 Natural Perspective	2 Elements of Civil Engineering
3 Analytic Chemistry	2 Hydraulic Turbine	4 Steam Engine Design
3 Hydraulics and Hydraulic Design	4 Theory of Steam Engine	2 Altern. Cur. Circuit and Apparatus
2 Direct Current Circuit and Apparatus	2 Direct Current Circuit and Apparatus	2 Electrical Laboratory
2 Direct Current Laboratory	2 Altern. Cur. Circuit and Apparatus	2 Elect. Apparatus Design
2 American History	2 Electrical Laboratory	2 Electric Lighting
1 Rhetoric	2 American History	2 American History
Lecture Course by Specialists[2]	2 Electrochemistry	1 Rhetoric
Inspection Trips	1 Rhetoric	Lecture Course by Specialists[2]
	Lecture Course by Specialists[2]	Inspection Trips
		Summer Vacation Work

[1] The figure at the left indicates the number of hours per week devoted to class work in the subject.

[2] See pages 152, 153.

CURRICULUM OF THE B. E. COURSE[1]—ELECTRICAL ENGINEERING

For the general plan of the course, see page 144. In 1904-5 the course was as follows:

Freshman and Sophomore Years as in General Course, page 158.

SENIOR YEAR.

First Term	Second Term	Third Term
3 Thermodynamics, Gas Engines and Steam Turbine	3 Transmission and Distribution	3 Elect. Apparatus Design
2 Altern. Cur. Circuit and Apparatus	2 Altern. Cur. Circuit and Apparatus	3 Transmission and Distribution
2 Electrical Laboratory	2 Electrical Laboratory	2 Electric Railway
2 Elect. Apparatus Design	3 Elect. Apparatus Design	3 Mod. Theory of Electrical Engineering
3 Transmission and Distribution	2 Electric Railway	3 Engineering Law and Procedure
2 Mod. Theory of Electrical Engineering	2 Electrochemistry	1 Tech. French or German
3 Economics	3 Mod. Theory of Electrical Engineering	Thesis
1 Tech. French or German	1 Tech. French or German	Lecture Course by Specialists[2]
1 Rhetoric	1 Rhetoric	Inspection Trips
Lecture Course by Specialists[2]	Lecture Course by Specialists[2]	
Inspection Trips.		

[1] The figure at the left indicates the number of hours per week devoted to class work in the subject.

[2] See pages 152, 153.

ALBANY MEDICAL COLLEGE

ALBANY, N. Y.

MEDICAL DEPARTMENT OF

UNION UNIVERSITY

SEVENTY-FOURTH SESSION

ALBANY MEDICAL COLLEGE

The Medical College building, situated on Eagle street, Albany, is well appointed in its lecture rooms, laboratories, dissecting room and museums. The chemical laboratory is fitted with every requisite for the illustration of the lectures and the use of students, while the Bender Hygienic Laboratory furnishes unexcelled facilities for instruction in histology, pathology, bacteriology and clinical microscopy.

The location of the college is such as to afford superior advantages to the student. The hospitals and dispensaries furnish an abundant supply of material for the illustration of clinical medicine and surgery, while the museums are especially rich in anatomical and pathological preparations.

With the session of 1897-'98 a four-year course was inaugurated, and four courses are now required by law in this state. The curriculum embraces lectures by professors and lecturers; recitations conducted mainly by instructors, and practical demonstrations, clinical teaching and laboratory work, in which the professors in the different departments are assisted by clinical assistants and demonstrators.

The Albany Hospital, St. Peter's Hospital, Child's Hospital, St. Margaret's House, Albany Hospital for Incurables, County Hospital, South End Dispensary, Eye and Ear Infirmary, Albany Orphan Asylum and dispensaries connected with each are, by the regulations of their governing boards, made available for clinical purposes to the students.

Appointments to positions on the house staffs of the Albany Hospital, and other hospitals in Albany and neighboring places, are annually made, and are competed for by the members of the graduating class.

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RECORDER OF ALBANY } *Ex-Officio.*

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Albany, N. Y.

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HERMAN BENDELL, M. D.
Otology

ARTHUR GUERNSEY ROOT, M. D.
Diseases of the Throat and Nose.

LEO HAENDEL NEUMAN, M. D.
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Adjunct Professor

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Minor Surgery

ARTHUR WELLS ELTING, M. D.
Surgical Pathology

GEORGE EMORY LOCHNER, M. D.
Gynecology

ARTHUR TURNER LAIRD, M. D.
Clinical Microscopy

THEODORE JAMES BRADLEY, PH. G.
Inorganic Chemistry

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Demonstrator in Anatomy of Nervous System and Assistant in Normal Histology

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SILAS LORENZO FILKINS, M. D.
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CALENDAR, 1905-1906

1905

Regular winter session begins..... Tuesday, September 26
Thanksgiving vacation begins..... Wednesday, November 29
Lectures resumed.....Monday, December 4
Christmas vacation begins..... Saturday, December 23

1906

Lectures resumed..... Wednesday, January 3
Commencement.....Tuesday, May 8

PRELIMINARY EXAMINATION.—The preliminary examination of medical students is under the control of the Board of Regents of the University of the State of New York. Those contemplating the study of medicine should apply to the High School Department, University State of New York, Albany, by letter or otherwise, if information concerning this examination further than that given in the catalogue of the Medical College is desired. One of the examinations will be held in Albany, September 26-29, 1905.

MID-WINTER WRITTEN EXAMINATIONS in all the departments are held before the Christmas vacation. A printed schedule of these examinations is furnished the class.

Course of Instruction

The four years' graded course required of all candidates for the degree of Doctor of Medicine embraces the following subjects:

First Year

1. **Anatomy**—three lectures; six hours osteology and dissection. 2. **Inorganic Chemistry**—three lectures; four hours laboratory; one recitation. 3. **Physiology**—two lectures; one recitation; two demonstrations. 4. **Histology**—five hours laboratory; one recitation. 5. **Materia Medica**—three lectures; two recitations.

Lectures 11; laboratory 9 hours; dissection and demonstrations 9 hours; recitations 5.

Second Year

1. **Anatomy**—three lectures; seven hours dissection and demonstration; two recitations. 2. **Organic Chemistry and Toxicology**—three lectures; one recitation. 3. **Hygiene**—one lecture. 4. **Physiology**—two lectures; one recitation. 5. **Therapeutics**—one lecture; one recitation. 6. **Theory and Practice**—two lectures; one recitation. 7. **Surgery (minor)**—one lecture; one demonstration; two hours clinics. 8. **Bacteriology and Pathology**—one lecture; seven and a half hours laboratory.

Lectures 14; dissections and demonstrations 8 hours; laboratory 7½ hours; recitations 6; clinics 2.

Third Year

1. **Theory and Practice**—four lectures; two recitations; two hours clinics. 2. **Clinical microscopy**—two and a half hours laboratory. 3. **Therapeutics**—two lectures; one recitation. 4. **Electro-Therapeutics**—one lecture half the term. 5. **Obstetrics**—two recitations. 6. **Pediatrics**—one lecture; one recitation half the term. 7. **Neurology**—one lecture; one recitation half the term; one clinic. 8. **Surgery (pathology, operative, fractures, dislocations)**—five lectures; two and a half hours demonstration; two recitations; three hours clinics. 9. **Physical Diagnosis and Ophthalmology**—section work, two hours. 10. **Medical Jurisprudence**—one lecture half the term. 11. **X Rays**—one demonstration half the term. 12. **Obstetrical Histology and Pathology** two hours laboratory. 13. **History of Medicine**—one lecture half the term. 14. **Conference**—one medical.

Lectures 15; laboratory 4½ hours; demonstrations 3 hours; conference 1; recitations 8; section work 2; clinics 6.

Fourth Year

1. **Theory and Practice**—three lectures; one recitation; two hours clinics. 2. **Neurology**—one lecture; one clinic. 3. **Gynecology**—one lecture. 4. **Obstetrics**—one lecture; one recitation. 5. **Surgery (including orthopedics)**—four lectures; one recitation; four hours clinics. 6. **Specialties**—one recitation. 7. **Conferences**—one medical; one surgical. 8. **Clinical section work**—thirteen hours.

Lectures 10; recitations 4; conferences 2; clinics 7; clinical section work 13 hours.

The order of instruction for the ensuing session will be found in the catalogue of the Medical College, and may be obtained by application to the Registrar.

Laboratories

Practical Chemistry.—The chemical laboratory is well furnished and conveniently arranged, each student having a desk and reagents for his own use, and being supplied with all necessary apparatus. The laboratory course is preceded, since although some knowledge of chemistry is highly desirable, none is now *required* at entrance, by a series of lessons upon chemical nomenclature, notation and the essential principles of theoretical chemistry, including the laws of combination and valence, and these subjects are therefore more briefly treated in the regular lecture course. The practical laboratory work includes tests for those metals and acids which, in combination, are important as constituents of medicinal compounds or as poisons, together with the separation of the chief groups and the examination of unknown substances. The more important toxicological and urinary tests are performed and all chemical reactions are written upon the blackboard, discussed by the class, and entered upon their notes.

Histology, Pathology, Bacteriology and Clinical Microscopy

Work in these departments is carried on in the Bender Hygienic Laboratory, on Lake Avenue, near the Albany Hospital.

This building was erected by Mr. Matthew W. Bender, of Albany, and is thoroughly equipped with the apparatus necessary for the study of histology, pathology, bacteriology and clinical microscopy. Practical work in these branches is obligatory upon all students, and abundant opportunity is furnished in the laboratory for acquiring a thorough knowledge of these important subjects.

In histology the work consists of explanatory talks on the subject of the day's study, followed by microscopic study of sections, each student being required to make drawings of his sec-

tions. The different tissues and organs of the body are taken up systematically.

In bacteriology the work consists of lectures, followed by practical laboratory exercises. It is intended to render the student familiar with the underlying principles of bacteriology, and their application to clinical medicine and surgery.

In pathology the work consists of a short lecture on the subject for the day, followed by practical exercises in mounting, staining and examining sections. Students make drawings of their sections. They are instructed in the technique of making autopsies, and material from autopsies and surgical operations is demonstrated to them as available.

In clinical microscopy the course consists of practical work in the examination of blood, urine, sputum, fæces, etc.

A limited number of students who have shown proper aptitude will be allowed to work along more advanced lines during the summer months.

For the Alumni of this school, and for physicians in the vicinity, this laboratory offers excellent facilities for the examination of urine, sputum, pathological specimens and blood. Information regarding such examinations may be obtained by communicating with Dr. Richard M. Pearce, Director.

Practical Clinical Courses

In order to familiarize students with the practical work of their profession, and to bring them into closer personal contact with patients, the fourth year class is divided into sections of eight or ten men, and on four days in each week each man devotes several hours to the examination and personal observation, under the supervision of the instructors, of patients in the wards and out-patient departments of the various hospitals and dispensaries. In this clinical work especial attention is devoted to the complete examination of the blood, urine, sputum and stomach contents, as well as to the special examination of the eye, ear and other organs. Thus in the course of the school year the men in each section acquire practical knowledge and technical diagnostic dexterity in general medicine, general surgery, dermatology, neu-

rology, insanity, otology, laryngology, ophthalmology, rhinology, diseases of children and infants, infant feeding, diseases of the rectum and genito-urinary tract, operative surgery, orthopedic surgery, operative obstetrics, electro-therapeutics and medical technique.

Fees and Expenses

Fees, excepting the final examination fee, are payable in advance, are not returnable, and are as follows:

FIRST YEAR.

Matriculation	$ 5 00
Lecture Course	100 00
Chemical Laboratory	10 00
Histological Laboratory	10 00
Dissection (including material)	5 00
	$130 00

SECOND YEAR.

Matriculation	$ 5 00
Dissection (including material)	10 00
Lecture Course	100 00
Bacteriological and Pathological Laboratory	15 00
	$130 00

THIRD YEAR.

Matriculation	$ 5 00
Lecture Course	100 00
Clinical Microscopy Laboratory	5 00
	$110 00

FOURTH YEAR

Matriculation	$ 5 00
Lecture Course	100 00
Final Examination	25 00
	$130 00

In addition to the fees above stated, an annual charge of two dollars is made to members of the first, second and third year classes taking laboratory courses at the Bender Laboratory, for use of microscopes and other apparatus. This fee is paid to the director at the laboratory, and after laboratory tickets have been issued by the registrar.

The payment of three hundred dollars in advance entitles to attendance upon four courses of lectures, exclusive of laboratory and other special fees above stated, and effects a saving of one hundred dollars on the cost of the four year course. The final examination fee must be paid before the examinations begin. Graduates of the school may attend lectures and stated clinics without charge except for matriculation in case of prolonged attendance.

The cost of living in Albany is less than in most other cities of its size. The janitor of the college keeps a list of boarding houses at which good rooms and board can be obtained at from four to five dollars a week or upwards, and by clubbing together students can live comfortably at still lower rates.

Requirements for Graduation

The candidate must be twenty-one years of age, and exhibit a certificate from a physician or surgeon, duly authorized by law to practice his profession, that he has studied medicine and surgery under his instruction during the period required by law in this state, and he must present evidence of having complied with the law concerning preliminary examination.

He must have attended not less than four regular courses of lectures, of which the last shall have been at this college. Students who have attended one or more courses of lectures at other recognized medical colleges, who may desire to be admitted to advanced standing in this college, will be credited with the work they may have done and with examinations they may have passed, other than those of the senior year, if satisfactory evidence of such attendance and of the passing of such examinations is presented.

He must be of good moral character.

He must maintain a satisfactory standing during his course and pass a satisfactory final examination in the several branches taught.

Regular and punctual attendance is required, and matriculation tickets are endorsed with attendance at the end of the term.

For catalogues or further information address

WILLIS G. TUCKER, M. D., *Registrar.*

Albany, N. Y.

January 1, 1905.

ALBANY LAW SCHOOL

ALBANY, N. Y.

LAW DEPARTMENT

UNION UNIVERSITY

FIFTY-FIFTH YEAR

1905–1906

ALBANY LAW SCHOOL

This School is among the oldest institutions of the kind in the country, having been established in 1851, and its graduates number many of the most successful men in the profession. The school is and has been largely represented in the Executive, Judicial and Legislative departments of this and many other States, as well as of the federal government.

It became a part of Union University in 1873, and begins its fifty-fifth year as a law school with the present scholastic year. During its long and successful career it has, in common with other law schools, done much to demonstrate what was at one time doubtful, but is now accepted almost as an axiom, that a course at the law school is a well-nigh necessary prerequisite to a successful professional career. Its instructors have always been men of repute and standing, both for professional learning and personal character.

Local Advantages

The local advantages of the city of Albany, as the seat of a professional school, can not be overrated. It is the capital of one of the leading States in the Union, whose legislature is in session here for the third part of the year, presenting opportunities not afforded by any other Law School in the State for observing the methods and procedure collectively of the executive, judicial and legislative departments of the State government. The knowledge thus obtained by the students at law, who are to complete their course and to enter the realm of public affairs, can not be overestimated.

It is easily accessible, remarkably healthful, and the scene of great business and professional activity. It is large enough to afford its inhabitants all the means of culture and recreation naturally to be looked for in a city, while it is not so large as to make the cost of living burdensome, even to persons of extremely limited means.

Facilities for Study

The facilities afforded the students for reading and study are unsurpassed.

Besides the convenient and well chosen library of the school accessible to the students at all hours of the day and evening, the students have the privilege of using the State Law Library, the most extensive and best selected in the United States, consisting of 65,000 volumes or more.

With free access to these libraries the student may be relieved to a great extent from purchasing text-books.

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Special Lecturers

The list of special lecturers is a notable one, including the former Chief Judge and an Associate Judge of the Court of Appeals, two Justices of the Supreme Court and a former Attorney-General.

Hubbard Chair of Legal Ethics

The circulars of seventy of the leading Law Schools of the country show that only twenty of this number make the subject of Legal Ethics part of their curriculum. With two exceptions, those schools are either in the West or South. These facts led Gen. Thomas H. Hubbard, class of '60, to place at the disposal of the Board of Trustees the sum of $10,000, the income to be applied to lectures upon this subject. The Board of Trustees decided to inaugurate the course at the opening of the school year of 1903. Gen. Hubbard, the founder of the chair, delivered the

opening lecture, and will be followed during the academic year 1904-5 by Judge Irving G. Vann and Judge William E. Werner of the Court of Appeals, Hon. Alton B. Parker, late Chief Judge of that Court, and Hon. William W. Goodrich, late Presiding Justice of the Appellate Division, Second Department.

Academic Year

The full academic course leading to the degree of LL. B. is two years, divided into two semesters each. The graduating course, preceded by one or two years in a law office, is one year. The latter course does not entitle a student to a Degree.

Requirements for Admission to Junior Class

The full course for study consists of two scholastic years. Any student who has conformed to the requirements of the Regents as to general education, or satisfies the Faculty that he will so conform to such requirements within the year allowed by the Regents for that purpose, after commencing the study of law, may enter the Junior class, and upon completion of the two years course and passing the required examinations will be graduated with the degree of LL. B.

College graduates will find this course well adapted to the requirements of the Court of Appeals, requiring them to study law two calendar years after graduation. They can enter the school upon presentation of their certificate of graduation, without examination, attend the full course of two years, of not less than eight months each, receive the degree of LL. B., and take the bar examination in June following their graduation from the school.

Requirements for Admission to Senior Class

Any student not a college graduate who has completed two years of required legal study, after conforming to the requirements of the Regents as to general education, or any college graduate who has completed one year of such study after graduation, and any student presenting a certificate that he has satis-

factorily completed one year of study at a law school of recognized standard, will be admitted to the Senior class without examination upon production of the Regents' certificates and certificate of Clerk of Court of Appeals, and will be graduated in the same manner as students have heretofore been graduated in the one year course, and receive a certificate for the time spent at the school; but the degree of LL. B. will be conferred only upon students who have completed the entire course of two years at a law school.

Requirements for Graduation

Candidates for graduation not candidates for the degree of LL. B. must have attended one year of not less than eight months, after one or two calendar years of ten months each of legal study, or have passed in the work of the Junior year, and must have passed all examinations and conformed to all the requirements as stated above.

Tuition

The fees for tuition are payable in advance, as follows: For the full course of one year, tuition, $100; matriculation fee, $10; diploma fee, $10; or $60 for the first semester and $60 for the second. For the full course of two years and degree of LL. B., tuition $100 each year; matriculation fee, $10; degree, $10; or $60 for the first semester and $50 for each semester thereafter, except the last, which will be $60.

For catalogues or further information address

ALBANY LAW SCHOOL, ALBANY, N. Y.

JNO. J. HUGHES, Secretary.

DUDLEY OBSERVATORY

ALBANY, N. Y.

ALBANY, N. Y.

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THE DUDLEY OBSERVATORY

The Dudley Observatory is located on Lake Avenue, in the southwestern part of Albany, to which site it was removed in 1893 from its former location in the northern part of Albany. It is devoted to original researches in astronomy, according to the purpose of its founders and successive patrons. Its contributions to science are represented in two volumes of "Annals," and in other published volumes and memoirs contained in the transactions of learned societies and astronomical journals. Its principal line of work at the present time is the determination of problems relating to the positions and motions of the stars and of the solar system as a whole. The staff consists of the director, three assistants, and several computers.

The instrumental equipment of the Observatory is designed for the purposes of exact measurement in line with its chosen work. In the tower of the main building is the Pruyn Equatorial, with object-glass twelve inches in diameter. This instrument is equipped both for visual and photographic use, and is of a high order of mechanical perfection. The Olcott Meridian Circle is located in a separate building, especially designed for securing the utmost equality in the temperature between the external air and that in the building itself. Its object-glass is eight inches in diameter. It was made by Pistor and Martins, of Berlin, and is regarded by astronomers as a masterpiece of accurate workmanship. This instrument has been employed for many years in obtaining the measurements necessary for the construction of the numerous and elaborate star catalogues which have issued from the Dudley Observatory.

In addition to these instruments, the observatory is in possession of various small telescopes, clocks, chronographs and smaller apparatus.

The institution is supported by an endowment, chiefly contributed by Mrs. Blandina Dudley and the late Catharine W. Bruce; as well as by appropriations which have been received from the National Academy of Sciences, and from current contributions of trustees and friends of the institution.

Since 1902 annual grants have been made to the director of the observatory by the Carnegie Institution of Washington. These have been sufficient to provide for the entire force of assistants and computers now employed.

The Dudley Observatory is not designed to give general instruction in Astronomy, though special students contemplating instruction in professional lines have been received from time to time under an arrangement of computing service to the observatory.

The observatory is opened to visitors on Tuesday evening of each week from 8 to 10 o'clock.

For further particulars apply to

LEWIS BOSS,

Director.

ALBANY COLLEGE OF PHARMACY

ALBANY, N. Y.

DEPARTMENT OF PHARMACY OF

UNION UNIVERSITY

ALBANY COLLEGE OF PHARMACY

The Albany College of Pharmacy was created by act of the Board of Governors of Union University, June 11, 1881, and constitutes the *Department of Pharmacy of Union University.* It was incorporated as the "Albany College of Pharmacy," August 27, 1881.

The exercises of the college are held in the Albany Medical College building, on Eagle street, distant but a block from the Capitol, and in the pharmaceutical laboratory on Maiden Lane. The lecture rooms and laboratories are well adapted to the needs of the college and furnish to the faculty excellent facilities for imparting instruction. The lectures are delivered in the chemical lecture room on the first floor, adjoining which is the large and well fitted chemical laboratory, where instruction is given to the classes in practical chemistry. The collections in the different departments are very complete and afford the professors ample facilities for the illustration of the lectures.

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FACULTY

ANDREW VAN VRANKEN RAYMOND, D. D., LL. D.
Chancellor of the University

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Professor of Chemistry

ALFRED BIRCH HUESTED, M. D., PH. G.
Professor of Botany and Materia Medica

GUSTAVUS MICHAELIS, PH. G.
Emeritus Professor of Pharmacy

THEODORE JAMES BRADLEY, B. S., PH. G., Secretary
Lecturer on Physics and Pharmaceutical Mathematics, and Instructor in Chemistry

GARRET VANDER VEER DILLENBACK, PH. G.
Associate Professor of Pharmacy

EDWIN CUNNINGHAM HUTMAN, PH. G.
Director of Pharmaceutical Laboratory

ARTHUR TURNER LAIRD, M. D.
Instructor in Microscopy

JAMES EMMETT HUESTED
Instructor in Materia Medica and Pharmacognosy

Calendar for 1905-1906

1905

Introductory lecture, Monday, October 2.

Election vacation, Monday and Tuesday, November 6 and 7.

Thanksgiving vacation begins Wednesday, November 29.

Lectures resumed Monday, December 4.

Christmas vacation begins Monday, December 25.

1906

Lectures resumed Wednesday, January 3.

Commencement (date to be announced).

Entrance Requirements

All applicants for admission to regular standing in this college will be required to present a Pharmacy Student Certificate issued by the New York State Education Department. The legal requirement for the issuance of such certificate is the possession of twelve Regents' counts, or an educational equivalent acceptable to the Regents.

The Curriculum

of the college embraces—

Chemistry—Theoretical, General, Pharmaceutical and Analytical.

Botany—Structural, Systematic and Analytical.

Materia Medica and Pharmacognosy.

Pharmacy—Theoretical and practical.

Microscopy—Theoretical and practical in its relations to Pharmacy.

Physics and Pharmaceutical Mathematics.

Requirements for Graduation

The diploma of this college confers the degree of Graduate in Pharmacy (Ph. G.). Applicants for this degree must be at least twenty-one years of age, of good moral character, have attended two full courses of lectures (which shall have included all laboratory practice) in this college, or the last course in this college and the first in some other college of pharmacy; have had, inclusive of the time of attendance at this college, four years' practical experience with some reputable and competent pharmacist; have passed a satisfactory examination and paid all fees as hereafter stated. Experience in wholesale stores cannot be taken in lieu of the practical experience in a retail pharmacy.

Fees for Tuition

FIRST YEAR

Matriculation	$ 5 00
Tuition	70 00

SECOND YEAR

Matriculation	$ 5 00
Tuition	70 00

Students who have attended two full courses of lectures at this college may attend further courses without extra charge. Payment of fees for laboratory and recitation courses will, however, be required, should the courses be taken.

Situations

Students desirous of obtaining employment while attending college will be assisted as far as possible in securing situations, but employment cannot be promised in advance, and places cannot be secured by correspondence. During the past year the

faculty has had a much larger number of openings offered for graduates to lucrative positions than it has been able to fill. The demand on the part of employers for skilled assistants is steadily increasing, and a college diploma or license from an examining board is demanded by law of those who engage in the practice of pharmacy in most of the states and cities of the Union.

For separate catalogue giving more complete information address

THEODORE J. BRADLEY, Ph. G., Secretary,
4 Lancaster Street, Albany, N. Y.

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